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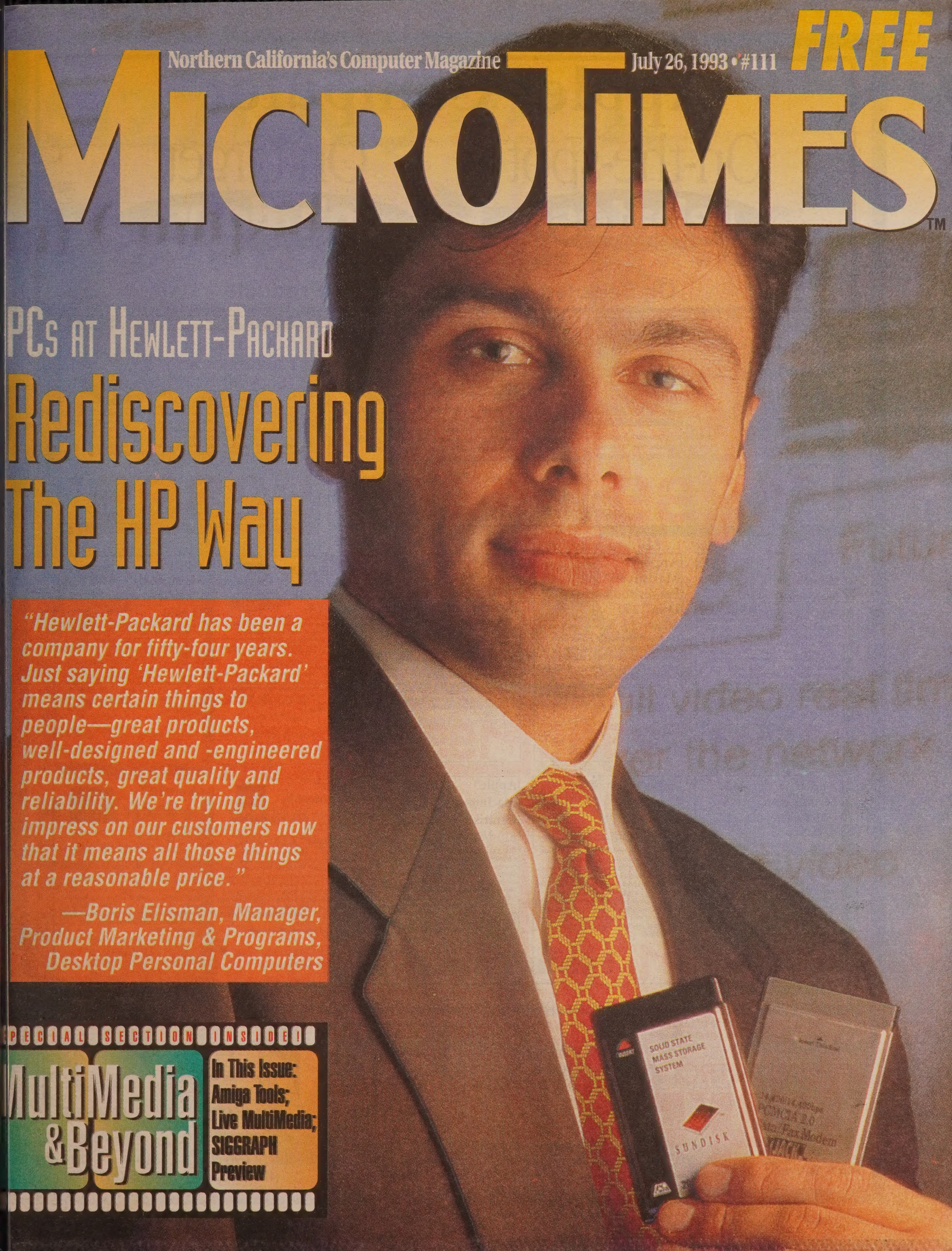

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—Boris Elisman, Manager, Product Marketing & Programs, Desktop Personal Computers

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In This Issue:
Amiga Tools;
Live MultiMedia;
SIGGRAPH Preview

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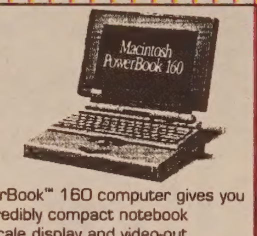

The Apple® Macintosh® PowerBook™ 160 computer gives you flexibility and power in an incredibly compact notebook computer. Its 16-level gray-scale display and video-out capabilities make it a good choice for anyone who works outside the office and needs a notebook computer for customer and client presentations.

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The Apple® Macintosh® PowerBook™ 180 computer is the most powerful member of the PowerBook family of notebook computers. It combines incredible speed with high performance and the best screen quality available today, to give you a notebook that's flexible, functional, portable, and powerful. The PowerBook 180 has everything you need for impressive client presentations. Video-out capabilities let you work on a variety of external displays, both monochrome and color. It comes standard with 4 megabytes of RAM and runs applications up to 50 percent faster than the PowerBook 140.

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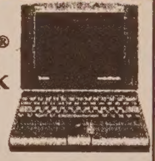
#1738339

$1399 *

Apple® Macintosh® PowerBook Duo™ 230 4/120



The Apple® Macintosh® PowerBook Duo™ 230 computer is Apple's highest-performance PowerBook docking system, offering you the convenience of a notebook computer plus the unique ability to take advantage of your desktop computer's files, storage, and accessories.
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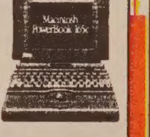
Apple® Macintosh® Color PowerBook™ 165c 4/80



With the PowerBook™ 165c, the impact and appeal of a bright, vivid color display is now available on a portable Macintosh computer. It delivers the processing speed, flexibility, and convenience you need all in a package that weighs just seven pounds and fits into a briefcase. It also features a backlit passive-matrix display that gives you 256 brilliant colors. You can also connect to a larger display for more work space.
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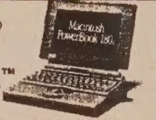
Apple® Macintosh® Color Powerbook™ 180C 4/80



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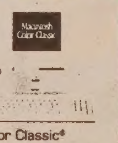

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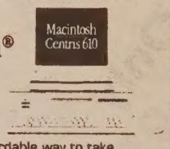

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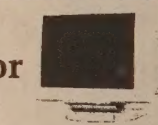

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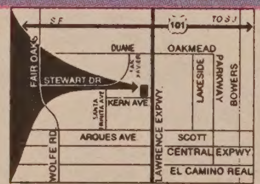

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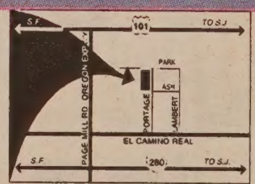

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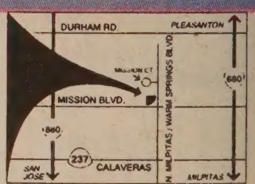

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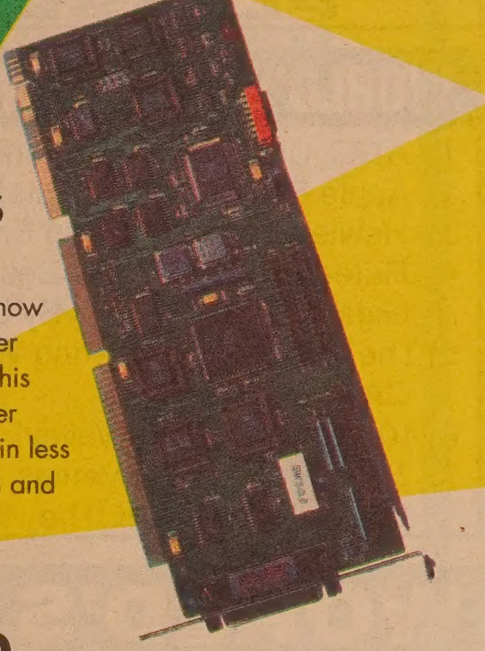

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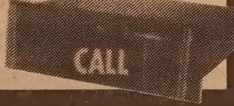

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A NOTE FROM THE EDITORS

Fifty-five years ago, when Bill Hewlett and Dave Packard founded a little startup in a Palo Alto garage and began selling electronic equipment to Disney, they probably didn't envision HP in its current state, but they established an ethos and a corporate culture that's served the company well as it evolved. In this month's cover story, assistant editor Michael Robin talks with Boris Elisman of the Desktop Personal Computers division about The HP Way, '90s style.

—ME

MICRO MARKET PLACE

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EVOLVING THE HP WAY

BY MICHAEL ROBIN 110

Cover Photo: Paul Winternitz

Almost fifty-five years after its legendary beginnings in Bill And Dave's Garage, Hewlett-Packard finds new levels of technological innovation and customer responsiveness.

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Last year's international symposium brought together electronic artists from around the world, and raised issues to be explored at this year's event in Minneapolis.

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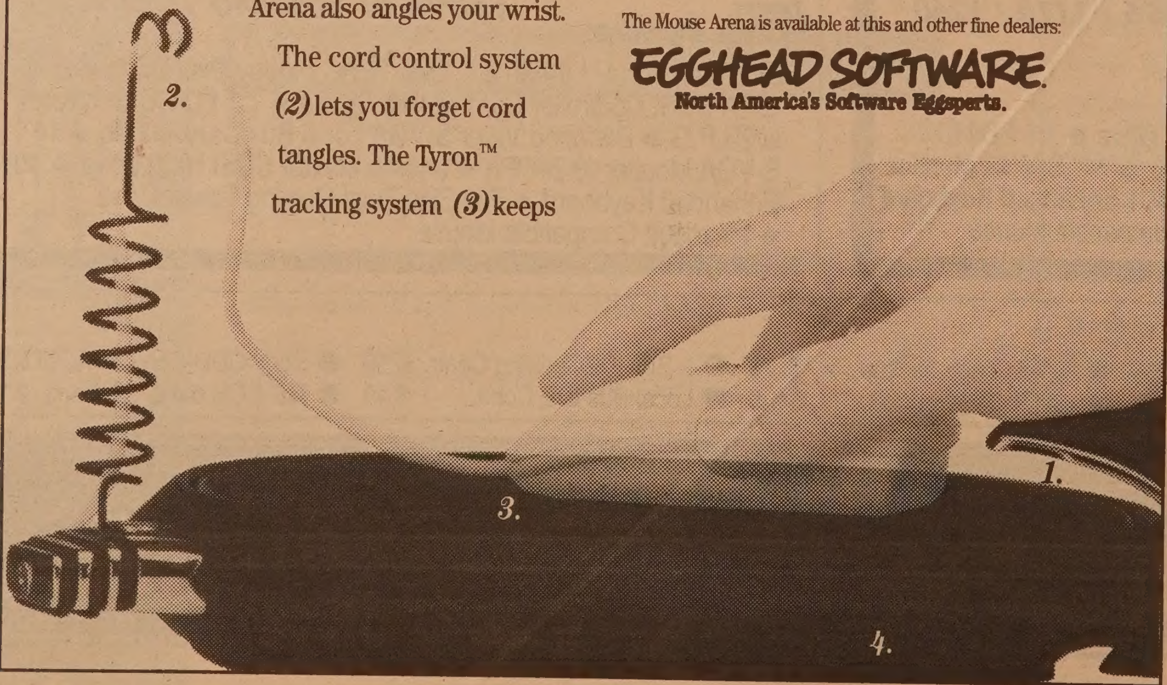

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- Basic System Configuration
- 120 MB Hard Disk IDE 15ms
- 14" SVGA Monitor
- 1.2 MB FDD
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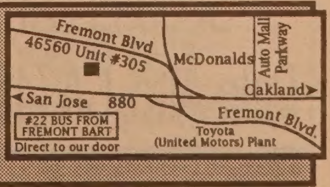

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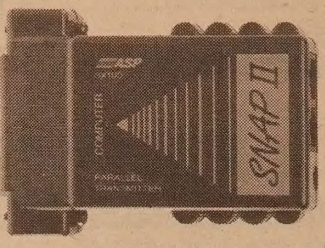

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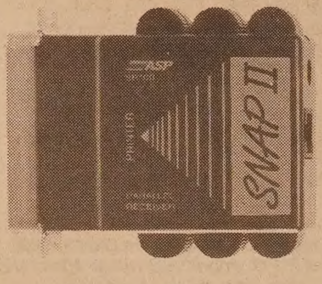

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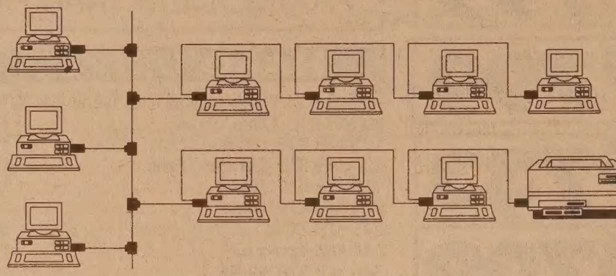

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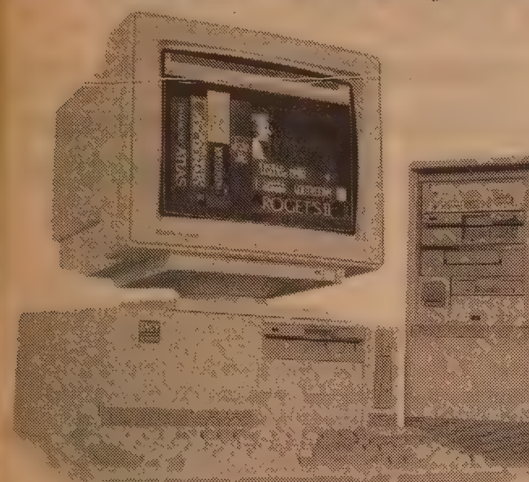

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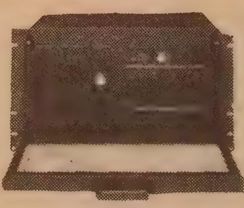

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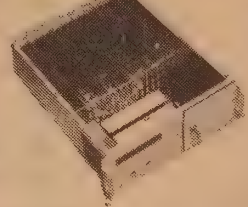

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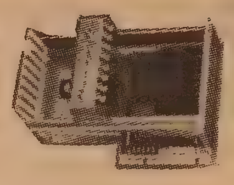

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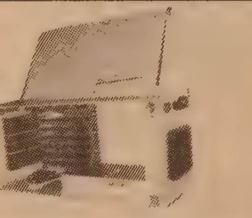

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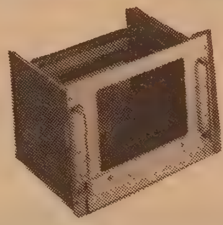

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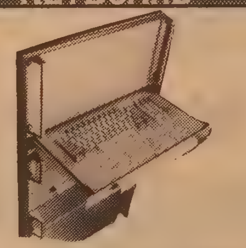

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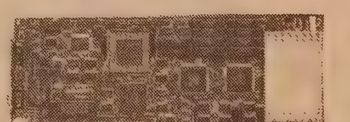

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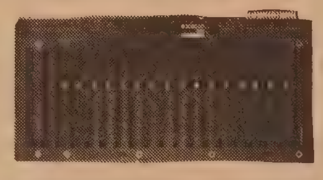

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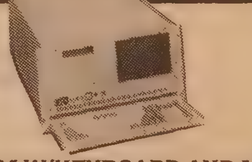

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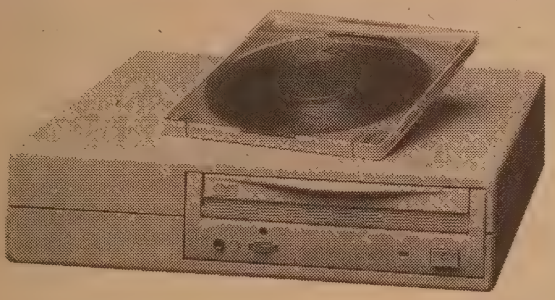

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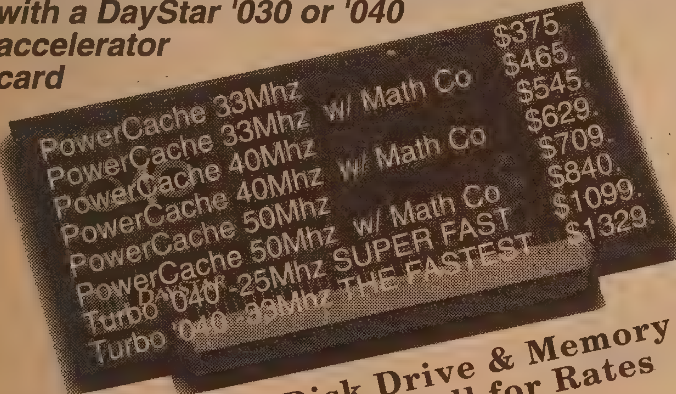

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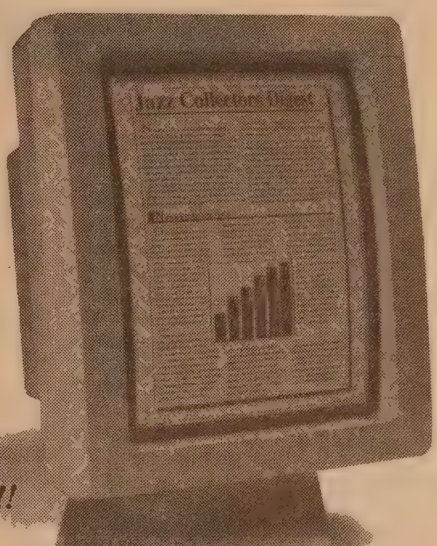

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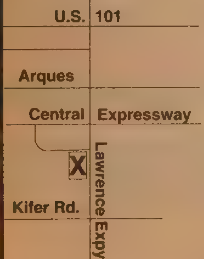

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NEWS & VIEWS

INDUSTRY INSIGHT

Flat-Panel Display Tariff Lifted

BY PAUL HOFFMAN

The US Department of Commerce has made American computer manufacturers very happy by lifting the heavy tariff they had put on imported flat-panel displays. The 63% tariff was originally demanded by a tiny American company that said that foreign competitor, notably Hosiden of Japan, were undercharging for the displays. As reported in MicroTimes #87, in 1991 the US government slapped the tariff on the screens even though the US firm could not manufacture nearly enough screens to keep even one company fully stocked. Flat-panel displays are used on virtually all portable and hand-help computers sold in the US.

> *With the tariff restrictions on screens lifted, computer makers will bring manufacturing back to the US and probably lower prices.*

In its new ruling, the Department of Commerce lifted the tariff after finding that the single American manufacturer, Optical Imaging Systems (OIS) of Troy, Michigan, was not a realistic competitor and that a great deal of American manufacturing of portable computers was being done overseas to avoid the tariff. Although OIS was also tiny at the time of the tariff, the Department of Commerce sought the tariff to make an example of Japan, even at the expense of US manufacturing.

Immediately after the announcement of the lifting of the tariff, Apple promised to start producing its new PowerBook 180 and 180C portable computers in the US because it could now afford the screens. Other major manufacturers are also expected to move production of the popular systems back to the US, and the prices of the portables will likely drop because of the lifted tariff.

LAPTOPS TO MAKE BIG STRIDES THIS YEAR

While much of the news in many circles is high-powered PCs based in Intel's Pentium CPU and high-end operating systems such as Windows NT and various flavors of Unix, a very different part of the computer market is starting to boom. Laptop computers, until recently a niche market with limited sales, have started to take off due to lower prices on Windows-ready systems and longer battery life. Although Intel will only deliver around 100,000 Pentium chips this year, millions of PC users will buy new laptop computers, hoping to finally be free of the large behemoths that are taking over their desks.

Until early this year, laptops that could run Microsoft Windows with any reasonable speed cost well over $2500, making cost-conscious buyers think more than twice about purchasing them. In the past few months, the cost of name-brand laptops with real 386 and 486 CPUs (instead of the somewhat anemic 386SX CPUs common in laptops) have dropped steadily. Much of the drop can be attributed to Intel's competition from chip makers AMD and Cyrix, who have been stealing the laptop market with CPUs more optimized for laptops at lower prices.

For example, even a top-name laptop like the Compaq 4/25, which has an Intel 486SL CPU, 4MB of RAM, 120MB hard drive, and weighs 6.2lbs. costs only $2000. Competing laptops with non-Intel CPUs can cost significantly less, and the standard price point for a "real" laptop is now in the $1500 range. This puts it in the same category as full desktop systems (that admittedly are much more expandable and have color screens), but frees buyers from having to compromise too much on CPU power.

At least for laptops, fewer companies are displaying the "Intel Inside" logo on their advertisements. AMD and Cyrix have made significant inroads in Intel's markets by underpricing and outperforming Intel CPUs. For example, an Intel 33 MHz 486SX CPU costs the computer manufacturer about $170; a similar-powered Cyrix CPU costs about $115. As an added incentive for ratings-conscious manufacturers, Cyrix offers the same CPU at 40 MHz for $150, beating Intel's prices while also offering much more performance. Intel is expected to deliver new CPUs aimed at this market

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later in the year. AMD and Cyrix will probably be able to drop their prices enough to counter any Intel move.

Price isn't the only thing that has been keeping customers back. Battery life for many portables is pretty terrible, and the prospect of only getting an hour of work done on the road before recharging kept lots of people using desktop computers. However, computer manufacturers, helped by the CPU makers, have come up with much better ways to keep batteries lasting longer. Most laptops now have internal circuitry that turns off the CPU and other power-draining chips when the computer is not in use, even between keystrokes. Although a fast typist can type over ten characters a second, a tenth of a second is a phenomenally long time for a computer. By shutting down and coming up between keystrokes (or mouse movements, or characters coming in from the modem), the overall power use of the computer goes way down, letting the battery last longer.

> *Currently, PCs use about 40 billion kilowatt hours per year. By the year 2000, that number will increase to over 100 billion kilowatt hours per year. With just using today's power-saving technology, the prediction for the year 2000 can be reduced to 30 billion kilowatt/hours/year.*

AMD and Cyrix have been challenging Intel on another laptop CPU front, and until recently winning handily. Most desktop computers run internally at 5 volts, but some work at 3.3 volts. The lower the voltage, the lower the power consumption. A 3.3 volt system consumes about 40% of the power of a 5 volt system. AMD and Cyrix pioneered the 3.3 volt systems, and Intel has had to play catch-up. However, now all three sell lower-voltage CPUs that contain support for stopping the CPU and other peripherals when the computer is not in use.

The result of these developments have been much better laptop computers. Hewlett-Packard's new "superportable" OmniBook 300 weighs only 3lbs. and runs eight hours on two AA batteries. From early reviews, the OmniBook 300 will challenge other manufacturers to reduce power consumption and weight by incorporating more features onto chips. The OmniBook comes with Microsoft Windows, Word, and Excel on ROM, greatly reducing the amount of time the 40MB hard disk needs to be used. Further, the OmniBook comes with a 20MB "flash" RAM-based hard disk that can almost eliminate the use of the rotating hard disk altogether, allowing it to be turned on only occasionally.

Hewlett-Packard is aiming the OmniBook at people who want to get the computer off of their desks, but need to have one around some of the time. Although its 386SX CPU is slower than its

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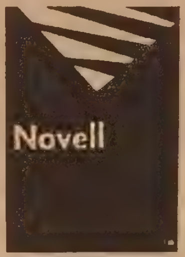

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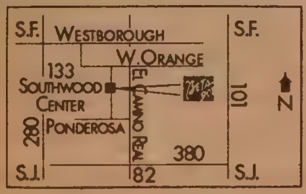

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competitors, many people with desktop PCs only use them an hour or two a day, so a bit of delay may be worth the freed-up desk space and the ability to take the computer on the road easily. On the other hand, people who use their computers much of the time will probably be more comfortable with a full 486-based system on their desk and a more powerful (but probably heavier and shorter battery life) laptop for the road.

The recent trends in laptops will continue for at least a year. With the tariff restrictions on screens lifted, computer makers will bring manufacturing back to the US and probably lower prices. The other chips used in laptops are getting better as well. At the recent MicroSystems Forum in San Jose, VLSI Technology announced the SCAMP IV, a two-chip set that replaces six or seven chips in earlier designs that handles all the peripherals, RAM, ROM, and other support that is needed to drive a computer. The chip set will also control a local bus for significantly faster RAM and graphics support, PCMCIA card support, and infra-red wireless communications support that allows non-wired connections with desktop systems. VLSI has competitors, and the result will be that laptops in the next year will have significantly more high-end features at probably the same (or lower) prices.

EPA INTRODUCES ENERGY STAR PROGRAM FOR POWER-CONSERVING PCs

While laptops draw only a few watts of power, desktop computers can easily draw over 100 watts. Most of the power is wasted, not even used for computing capabilities. In order to save electricity, the US Environmental Protection Agency has set up a new voluntary program to promote PCs that drop back to lower power consumption when you aren't using them. These so-called "green PCs" will sport a special logo, the Energy Star, and will probably be preferred for purchase by federal agencies. Hopefully, the average consumer will look for the logo as well.

You might think that concern about how much power a few PCs can save is minor relative to the really big wasters, but it is so simple to cut down energy use in PCs that to not do so is silly. Currently, PCs use about 40 billion kilowatt hours per year. By the year 2000, that number will increase to over 100 billion kilowatt hours per year with more users and users having more than one PC. With just using today's power-saving technology, the prediction for the year 2000 can be reduced to 30 billion kilowatt/hours/year, less than current use.

President Clinton gave a great deal of impetus for the Energy Star program in his Earth Day address this year. Energy Star PCs will be strongly preferred in federal contracts as long as they meet the same performance requirements as the nonefficient PCs they compete with. The official Energy Star announcement was made by Vice President Al Gore, a known technophile.

It is expected that most manufacturers who compete for federal contracts will make wide ranges of Energy Star PCs so they can compete for future contracts. Local utilities such as PG&E will also likely specify Energy Star PCs and possibly even give rebates for purchases of Energy Star PCs, similar to the way they give rebates for buying home insulation.

To qualify for the EPA's Energy Star logo, a PC has to power down to under 30 watts when it is inactive. The same will have to be true for the monitor. Some recent computers already qualify for the Energy Star, and manufacturers will put the logo on new systems as they are made. There is a similar program for laser printers, which must drop to a lower-energy idling stage after 15 or 30 minutes; many printers on the market already do so as a way of prolonging their time between failures.

Immediately after the announcement, major manufacturers such as Dell, Hewlett-Packard, IBM, and ALR announced various systems that qualify for the Energy Star logo. Most other major PC makers, including Apple, pledged to release Energy Star computers this year. In fact, Apple recently released its new Personal LaserWriter 300 which only draws 5 watts of power when idle, eliminating the need to turn it off when not in use.

Even if you don't buy an Energy Star PC, you can significantly reduce your power consumption simply by turning off your PC and monitor when they are not in use. A typical PC that is left running 24 hours a day consumes 1300 kilowatt hours per year; one that is turned off at night uses only 400, accounting for a savings of $70 dollars a year and a cleaner environment. A typical Energy Star PC will use less than half that power, and future energy-efficient PCs may reduce that by an order of magnitude to about 25 kilowatt hours per year. ■

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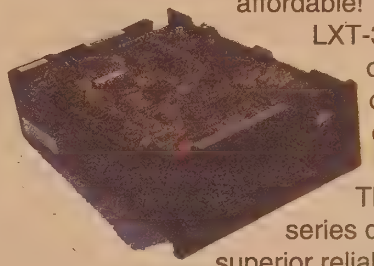

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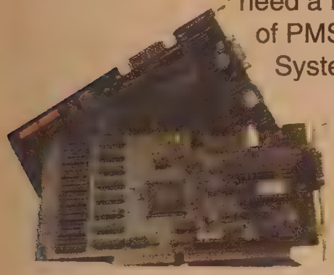

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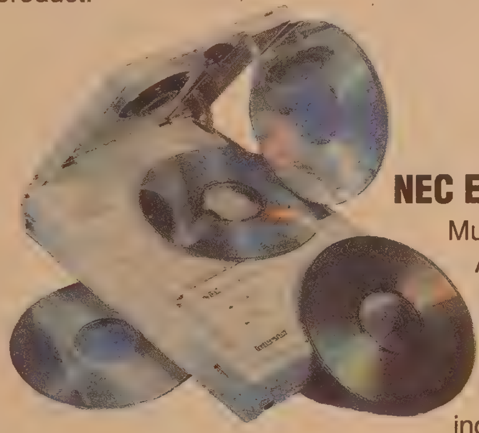

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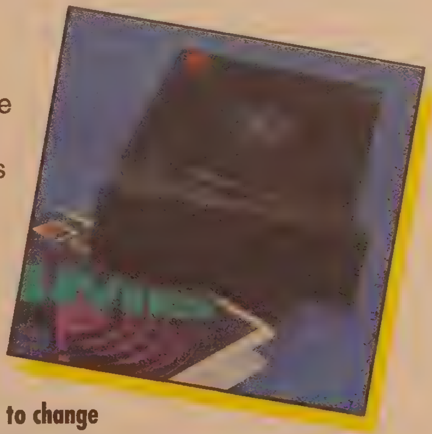

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MICROTIMES STOCK INDEX FALLS FOR MONTHLY PERIOD

For the monthly period ended June 24, the MicroTimes Stock Index cascaded 287.98 points, or 6.32%, and came crashing down to 4266.52. The Dow Jones Industrial Average also traveled a southerly course, decreasing 64.22 points, or 1.81%, en route to a close of 3490.61. For the month, declining issues outweighed advancing issues by a 20 to 11 count, with one stock reaching a new 52-week low.

Adobe Systems recently reported second-quarter earnings as follows: earnings per share declined to 62 cents, compared to 65 cents a share one year earlier. Revenue for the company was reported at a record high of $79.7 million compared to $69.6 million in the previous comparable quarter. For the month, Adobe Systems eased backwards as the stock fell $2.38, or 3.51%, and came to a close of $65.25.

Novell and Oracle announced a group project to produce a product called Oracleware. This new product will help unite leading network and information technology with sales, support, and distribution programs. For the period, Novell fell $3.75 before coming to rest at $25.75. On the other side of the ledger, Oracle inched forward 63 cents, or 1.43%, and closed the trading at $44.25.

BellSouth announced an 11-cent loss per share for the second quarter due to debt refinancing, compared to a 94-cent gain in the comparable period one year ago. The company stated the refinancings would save $500 million in interest expenses over the period of the new issues. The stock price increased $3.00 for the period and closed at $55.00.

Commodore International received the dubious honor of being largest percent loser of the month, as it fell 34.38% before finally coming to rest at $2.63. Commodore hit a new 52-week low for the period. The company announced that third-quarter losses amounted to $5.37 a share compared to a 12-cent-per-share gain one year ago.

In closing, Intel and Informix completed previously announced 2-for-1 stock splits. For the month, Intel closed at $53.75, and Informix closed at $22.75. ■

EXCH	COMPANY	TICKER SYMBOL	CLOSING PRICE 05/27/93	CLOSING PRICE 06/24/93	NET CHANGE IN MONTH	PERCENT CHANGE IN MONTH	P/E RATIO	ANNUAL DIVIDEND RATE	ANNUAL DIVIDEND YIELD	ANNUAL HIGH	ANNUAL LOW
	SOFTWARE										
OTC	Adobe	ADBE	67.63	65.25	–2.38	–3.51	33	0.40	0.61	65.25	25.25
OTC	Aldus	ALDC	16.25	16.25	0.00	0.00	90	0.00	0.00	21.00	10.25
OTC	Autodesk	ACAD	50.75	54.00	3.25	6.40	27	0.48	0.89	56.50	32.75
OTC	Borland	BORL	25.88	22.38	–3.50	–13.53	–	0.00	0.00	54.50	17.50
OTC	Informix	IFMX	22.50	22.75	0.25	1.11	27	0.00	0.00	24.88	6.06
OTC	Lotus	LOTS	35.50	33.00	–2.50	–7.04	19	0.00	0.00	36.75	14.75
OTC	Microsoft	MSFT	94.13	88.50	–5.63	–5.98	30	0.00	0.00	95.25	65.50
OTC	Novell	NOVL	29.50	25.75	–3.75	–12.71	28	0.00	0.00	35.25	22.50
OTC	Oracle (H)	ORCL	43.63	44.25	0.63	1.43	63	0.00	0.00	44.25	14.00
OTC	Software Publishing	SPCO	7.38	7.25	–0.13	–1.69	–	0.00	0.00	15.00	6.75
OTC	Symantec	SYMC	17.13	14.13	–3.00	–17.52	–	0.00	0.00	44.25	5.88
	HARDWARE										
OTC	Apple	AAPL	57.38	41.75	–15.63	–27.23	10	0.48	1.15	65.25	41.50
OTC	AST Research	ASTA	17.00	14.75	–2.25	–13.24	9	0.00	0.00	24.25	11.25
NYS	Commodore (L)	CBU	4.00	2.63	–1.38	–34.38	–	0.00	0.00	12.50	2.63
NYS	Compaq	CPQ	58.88	52.50	–6.38	–10.83	16	0.00	0.00	59.75	23.13
NYS	Digital Equipment	DEC	44.75	40.63	–4.13	–9.22	–	0.00	0.00	49.25	30.38
OTC	Dell	DELL	23.63	20.38	–3.25	–13.76	9	0.00	0.00	49.88	15.00
NYS	Hewlett–Packard	HWP	84.88	80.75	–4.13	–4.86	23	1.00	1.24	88.88	50.25
NYS	IBM	IBM	53.25	48.75	–4.50	–8.45	–	2.16	4.43	100.38	45.88
NYS	Silicon Graphics	SGI	36.75	35.25	–1.50	–4.08	–	0.00	0.00	37.38	16.13
OTC	Sun Microsystems	SUNW	31.13	28.63	–2.50	–8.03	26	0.00	0.00	41.00	22.50
NYS	Xerox	XRX	75.50	79.00	3.50	4.64	–	3.00	3.80	88.88	66.75
NYS	Tandy	TAN	32.00	29.25	–2.75	–8.59	26	0.60	2.05	32.13	22.25
	CPU'S										
NYS	Advanced Micro Devices	AMD	29.38	21.25	–8.13	–27.66	9	0.00	0.00	32.88	7.38
OTC	Intel	INTC	56.38	53.75	–2.63	–4.66	16	0.20	0.37	60.63	27.13
NYS	LSI Logic	LSI	13.63	14.13	0.50	3.67	–	0.00	0.00	14.13	4.88
NYS	Motorola (H)	MOT	82.25	83.63	1.38	1.67	34	0.44	0.53	83.63	37.13
	COMMUNICATIONS										
NYS	AT&T	T	61.63	62.25	0.63	1.01	21	1.32	2.12	62.38	40.63
NYS	BellSouth Corp.	BLS	52.00	55.00	3.00	5.77	17	2.76	5.02	57.50	46.75
OTC	MCI (H)	MCIC	52.88	56.63	3.75	7.09	24	0.10	0.18	56.63	29.88
NYS	Northern Telecom	NT	36.25	36.63	0.38	1.03	18	0.36	0.98	46.00	30.50
NYS	Pacific Telesis	PAC	47.38	47.75	0.38	0.79	22	2.16	4.52	49.38	39.25

KEY: NYS = NEW YORK ASE = AMERICAN OTC = OVER THE COUNTER
(H) = NEW HIGH REACHED IN PERIOD (L) = NEW LOW REACHED IN PERIOD

MARKET DIARY:

ADVANCES	11
DECLINES	20
UNCHANGED	1
NEW HIGHS	3
NEW LOWS	1

MOST ACTIVE ISSUES:

LARGEST DOLLAR GAINER	MCI	$ 3.75
LARGEST DOLLAR LOSER	Apple	$ –15.63
LARGEST PERCENTAGE GAINER	MCI	7.09 %
LARGEST PERCENTAGE LOSER	Commodore	–34.38 %

	CLOSE 05/27/93	CLOSE 06/24/93	NET CHANGE IN MONTH	PERCENT CHANGE IN MONTH
MICROTIMES STOCK INDEX	4554.50	4266.52	–287.98	–6.32
DOW JONES INDUSTRIAL AVERAGE	3554.83	3490.61	–64.22	–1.81
STANDARD & POOR'S 500 STOCK INDE	452.41	443.19	–9.22	–2.04
N.Y.S.E. COMPOSITE	249.43	246.60	–2.83	–1.13
NASDAQ COMPOSITE	704.59	688.72	–15.87	–2.25

CLOSING QUOTES FOR GRAPH:		
DATE	MICRO TIMES	DOW JONES
12/10/92	3825.83	3312.19
01/11/93	4020.09	3262.75
02/05/93	4083.40	3442.14
03/04/93	4127.80	3398.91
04/01/93	4196.89	3439.44
04/29/93	4074.63	3425.12
05/27/93	4554.50	3554.83
06/24/93	4266.52	3490.61

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POWERBOOK 180 4/120	$3,239*
POWERBOOK 180, 4/120 W/EXPRESS MDM	$3,738*
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POWERBOOK 180C 4/160	$3,633
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POWRBK DUO 230 4/120, W/EXPR MODM	$2,582

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MAC IIVX 4/230	$1,567*
MAC IIVX 8/230	$1,728*
MAC CENTRIS 610 4/80	$1,254*
MAC CENTRIS 610 4/80, W/ETH	$1,347*
MAC CENTRIS 610 8/230	$1,812*
MAC CENTRIS 610 8/230,W/CD-ROM	$1,984*
MAC CENTRIS 650 4/80	$2,284
MAC CENTRIS 650 8/80,W/ETHERNET	$2,699
MAC CENTRIS 650 8/230	$3,012
MAC CENTRIS 650 8/230,W/CD-ROM	$3,333
MAC CENTRIS 650 8/500	$3,647
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MAC QUADRA 800 8/500	$4,409
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CONTURA 4/25CXMOD 209/W	$3,503
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LTE LITE/25E,M120/W	$2,648
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LTE LITE 4/25, M120/W	$2,569
LTE LITE 4/25, M209/W	$2,855
LTE LITE 4/25E, M120/W	$3,157
LTE LITE 4/25E, M209/W	$3,443
LITE LITE 4/25C,M120/W	$3,899
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PROLINEA 4/66,M120/W	$1,903
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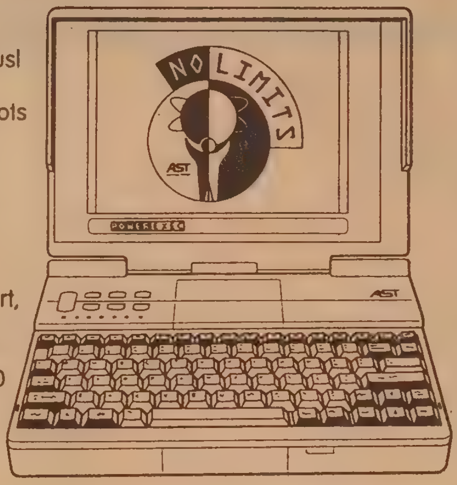

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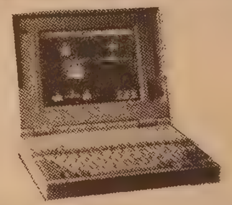

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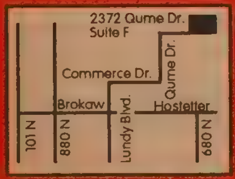

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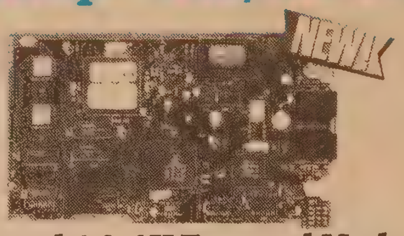

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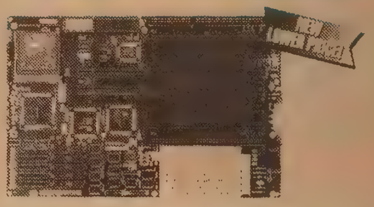

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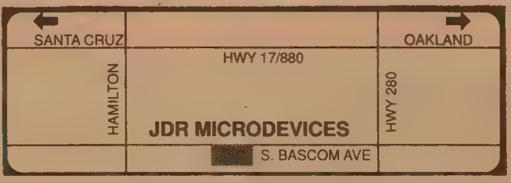

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Public Access: Some Legislators Still Don't Get It

It Is A Moral Outrage For A Democratic Government To Demand High Fees As A Prerequisite For Equal Access To The Process Of Governance

BY JIM WARREN

REALIZABLE FANTASIES

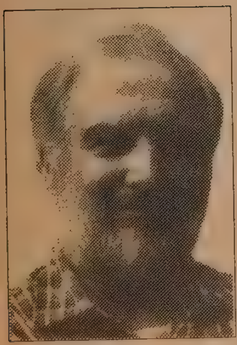
First, many thanks for the letters and e-notes urging more reporting and advocacy of access to computerized public records. We will continue.

Our recent focus has been Assembly Bill 1624 (Bowen, D-Torrance)—mandating free, timely, public, online access to California's already computerized public legislative information via the largest public, nonprofit, nonproprietary network of networks, the Internet.

CURRENT ACCESS ONLY FOR THE WEALTHY

So far, invaluable online access is limited only to those corporations and special interest groups wealthy enough to pay high fees to the few private distributors that functionally monopolize access—primarily Legi-Tech, State Net, and several other services to which they redistribute data.

They get legislative data under a cozy arrangement that pours several hundred thousand off-budget dollars annually into the coffers of the Legislative Counsel who runs the Legislative Data Center (LDC)—the same Counsel who gives technically naive legislators advice about online access through the LDC and legally advises them about AB1624. (Legally, anyone can buy the data—at 50 cents/kilobyte on magtape, FOB Sacramento; 700+ MB for a legislative session.)



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GLIMMERS OF EQUITABLE ACCESS

Exclusively due to widespread public support and a flood of faxes and letters, AB1624 passed the Assembly Rules Committee, 8-0, the Assembly Ways and Means Committee, 21-0, and the full Assembly, 78-0.

But it is a false dawn for freedom—just the first turf tiff.

The bill must pass the Senate—in particular the Rules Committee run by David Roberti (D-Van Nuys). He might be supportive, but there is widespread opinion that the Senate's chief executive officer will vigorously oppose it behind the scenes, as did his counterpart in the Assembly.

If it passes Roberti's committee and the Senate, then the Assembly must concur with some improving amendments—or kill the bill. Then Governor Wilson would have to sign it—in spite of his deputy chief of staff being executive vice president of State Net.

Only public pressure will keep AB1624 alive.

ROYALTIES FROM DATA SERVICES

This bill would make the public data available to anyone for free. Some legislators—notably Rules Committee chair John Burton (D-San Francisco), who has the clout to kill the bill—are concerned that entrepreneurs would get free copies of the data and sell it. They are undoubtedly thinking of the current high-priced distributors.

LEGISLATORS HAVEN'T THOUGHT IT THROUGH

Swamped with other legislation—and lacking objective advice from loot-seeking bureaucrats—these legislators simply haven't realized:

- Who would pay for public information that was widely and readily available for free?
- Entrepreneurs could get folks to pay *only* for significant added value—thus paying for the value-added, not for the free public data. The fact that possible value-added services might be based on public legislative data no more justifies charging royalties than it would be to charge lawyers who base their services on public statutes.
- Even for value-added services, competition would drive prices down, replacing the current bureaucracy-supported sky-high pricing.
- Electronic public records should be treated like paper records—and lobbyists, interest groups, legal reporting services, etc., can freely duplicate and distribute paper bills, charging fees for their copying and distribution services.
- Similarly, libraries that carry paper copies of legislative data pay no royalties—even those that charge for access.
- With about 1.5 million Internet hosts and twenty thousand FidoNet BBSes, policing such legislative permission, contract requirements, and royalty collection would be ludicrous—generating nothing but ridicule, disregard, and fury for a Legislature seeking to profit from public access.
- *If* a BBS or Internet-host operator charges anything for access, it's usually a single fee for a wide range of services and information access—California's legislative data would be a wee tiny portion. And almost none monitor which customer uses what services or accesses which data.
- Demands for contracts and impractical royalties would simply suppress public access—especially since most operators that charge anything at all typically charge perhaps 25 cents per hour or $15 to $30 per month.
- Rather than attempting to control and

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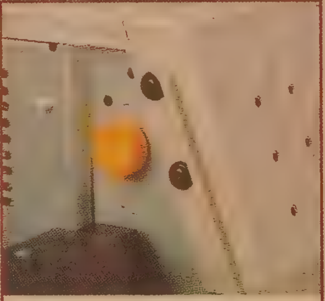

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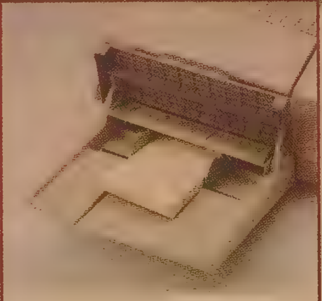

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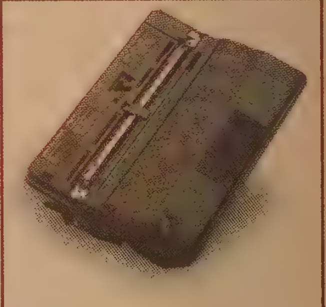

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profit from others' distributing public information, *legislators should realize that electronic information distribution is simply a populist technology offering the same functions as the Constitutionally protected free press—essential to a free society.*

ENCOURAGE HIGH-TECH INFRASTRUCTURE

California legislators should *encourage*—not deter—the expansion and use of the state's information industry and infrastructure. It creates many of the best jobs in the state. Making public records public via that infrastructure—freely and equally accessible to all—will further contribute to its development and use.

WHY IS IT IMPORTANT?

Public access to government records is prerequisite for *informed* participation in the process of governance.

Timely access is essential if anyone other than capitol insiders and well-funded lobbyists are to functionally participate in the legislative process.

And—convenient, economical access is essential if citizens are to verify the accuracy (or sloppiness) and objectivity (or bias) of news-media reports.

Democracy and freedom survive only in the presence of timely public access to information about government.

WHO WOULD IT SERVE?

A 1989 US Census Bureau study reported that seventy-five million Americans had daily contact with computers (thus, eight to ten million of California's 31.5 million)—37% of all adults, 46% of all students.

The Internet had about 727,000 host computers in early 1992, and 1,313,000 hosts a year later—over 80% growth in one year.

CompuServe, America Online, MCImail, GEnie, Delphi, and numerous other nets are gatewayed to the Internet, as is FidoNet, which connects over twenty thousand mostly free BBSes (bulletin-board systems).

Ten to twenty million people have direct or gatewayed access to the Internet, with growth variously estimated at 8% to 15% per *month.*

Thus, California has seven hundred thousand to a million or more citizens using computers connected or gatewayed to the public Internet—most users having *free* access at work or school.

Anyone *can* have access, sometimes without cost through the FreeNets, community networks, some BBSes, or libraries; otherwise for about double the cost of a monthly metro newspaper—but offering orders of magnitude more services and information in much more useful (computerized) form.

TAXPAYER COSTS—AND SAVINGS?

The Internet file-server we have proposed would cost about $5000, plus about $200/month to operate. Even the $50,000 that Legislative Counsel wants to implement AB1624 boils down to about 5 cents per year per person for the million-or-so Californians already online—not worth the billing costs.

Legi-Tech and State Net collected over $285,000 from California's Department of General Services, alone, in 1992, for online access to public legislative data.

The League of California Cities and the California State Association of Counties (CSAC) each have State Net contracts providing (tax-paid) online access for their member cities and counties. The League and CSAC each receive a 9 1/2% kickback—uh, commission—*each* reportedly receiving $25,000 to $30,000 annually. Thus, California cities and counties are paying State Net $520,000 to $630,000 for online access to public legislative data.

In comparison, in 1992, Legi-Tech and State Net paid the Legislative Counsel about $295,000—big profits in the absence of competition.

And this only *hints* at what other agencies and districts—and their lobbyists—might be paying big local tax bucks to access public data; district attorneys, public defenders, school districts, water districts, sewer districts, open space districts, etc.

California has seven hundred thousand to a million or more citizens using computers connected or gatewayed to the public Internet—most users having *free* access at work or school.

HOW MUCH SHOULD WE PAY? AGAIN?

Tax-paying citizens and corporations have *already* paid for computerizing our public legislative records—created to enhance the legislative process to which the public has so little useful access.

Agencies *should* charge the direct, incremental cost of duplication for providing copies of public records—but not when billing costs wildly exceed pennies-per-year copying costs.

However, access to legislative information must not continue to be limited only to those wealthy enough to pay fees far in excess of copying costs. *It is a moral outrage for a democratic government to demand high fees as a prerequisite for equal access to the process of governance.*

TAKE ME TO YOUR LEADERS

The preceding could be quickly excerpted into "Resolutions" for organizations supporting AB1624—community groups, nonprofit organizations, and especially local, city, and county agencies and districts that expend *considerable* staff time and funds seeking information about legislation impacting them.

Clip and mail, now, to your local civic groups, boards, councils, and commissions.

TECHNO TALKS

I often speak on technology, government, freedom and privacy, and also about personal computing's history and futures. I will be a panelist discussing these issues at the Inet'93 Internet conference in San Francisco, August 18th (216/425-8333), and will speak at the OneBBScon '93 convention in Colorado Springs, August 25–29 (303/693-5253). ■

Warren founded InfoWorld, Wireless Digital, Initiative, Inc. and one of the nation's largest public microcomputer conventions. He was founding host of PBS's Computer Chronicles, *founding editor of* Dr. Dobb's Journal, *and has chaired various trade and professionals' organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center), and mathematics & statistics. He has been a computer professional since 1968, and was a mathematics teacher and professor for ten years before that.*

He organized and chaired the landmark First Conference on Computers, Freedom & Privacy (1991) and received one of the first Electronic Frontier Foundation Pioneer Awards (1992). He is a member of the board of directors of Autodesk, Inc., and also chairs the Communications Committee of the California Public Records Act Reform Coalition.

Letters

AN ERROR OF MAGNITUDE

Thank you for the excellent article [Issue #107]. You provided a comprehensive view of Acer America with a very clear understanding of the several factors that have contributed to the company's success in the last year.

I wanted to call your attention to one small error. You correctly quoted me as saying The Acer Group (of which Acer America is a subsidiary) has five thousand employees. However, a typographical resulted in the statement that there are eight employees in research and development. The actual number is eight hundred, a figure in line with our 4% to 5% investment in R&D.

Once again, I appreciate your thorough approach in writing about our company, and I look forward to following your insightful coverage of this dynamic industry.

Ronald Chwang
President and COO
Acer America Corporation
San Jose

Our heartfelt apologies to Mr. Chwang and all the fine people at Acer for this unfortunate error!—eds.

ON INTELLECTUAL PROPERTY AND INTERFACES

One big advantage of Brenda Laurel's view of the human-computer relationship [Issue #109] is that if the conventional idea of authorship is obsolete, so is the idea of copyrights. About time. It's never seemed valid to try to own information, which is a bit like "The Magic Penny"—when you "give it away," you still have it. Now is there a similar way to get rid of patents?

Computers are transforming joint human consciousness from the hierarchical form to the cooperative form, more like the workings of the individual human brain. There is no one brain cell in charge of all the rest.

Some parts of computer literacy aren't such stupid ideas. It's just that our much slower rate of evolution makes it pretty hopeless that we'll ever convert to the computer's more efficient languages, such as base-sixteen instead of base-ten counting.

Besides our relationship to the "representation," we also have a relationship, or interface, to the computer as a tool, one which seems rather primitive to me. We mostly still use keyboards designed around the constraints of early mechanical typewriters.

No doubt eventually we'll more generally use interfaces similar to those being developed for virtual reality, worn on the head and hand. Until then, how about keyboard electronics that allow each key to be programmed for four different meanings (normal, Shifted, Control, and Alt) so keyboards can evolve to more advanced standards?

New topic: I haven't experienced Internet Talk Radio. In fact I haven't done much with Internet, because I've never found a friendly system, or an easily available one. But based on your article [Issue #109N], it seems to move away from two societal advantages of electronic networking. It has obvious advantages over other audio media, but what does it have over text-based online services?

The printed word avoids the emotional sales appeal of the human voice, or music. Whether or not it's intended, the voice can be much more convincing. Read about I.F. Stone and the beginnings of his weekly newsletter. Or read *Mein Kampf*. We can do without more good sales techniques for mediocre, and worse, products and ideas.

When you create a "show," with a group of selected well-known names, you create a gap between talker and the average listener, thereby reducing feedback, creating basically one-way communication. On a text-based system, we're judged more on what we say than who we are. My ideal would be a system with an "electronic magazine" where readers vote on the worth of what they read, thereby becoming the editors, and authors (or "inputters"?) are paid accordingly.

Dan Robinson
Berkeley

Mr. Robinson raises a number of interesting and controversial points; we invite comments from our readers. We also note in passing that dispensing with copyrights and patents would require major surgery to the Constitution, and that a publication scheme very like the one Mr. Robinson describes is at the heart of Ted Nelson's long-deferred Xanadu project.—eds.

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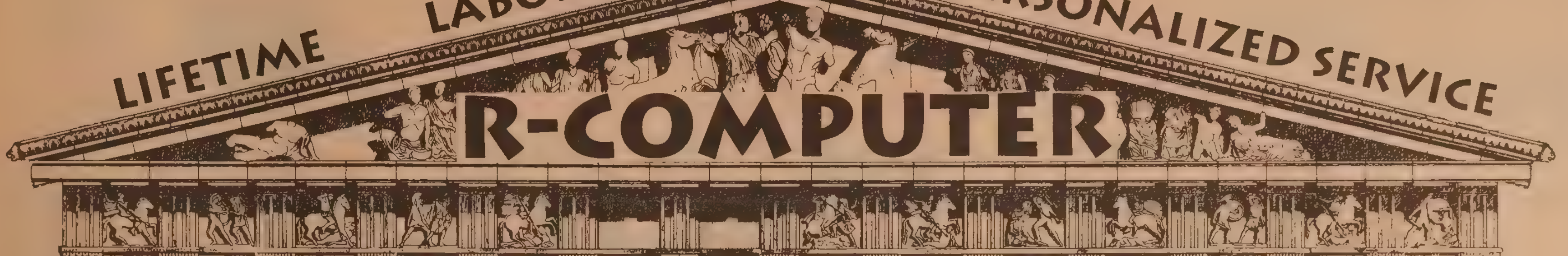

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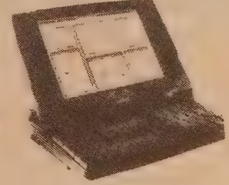

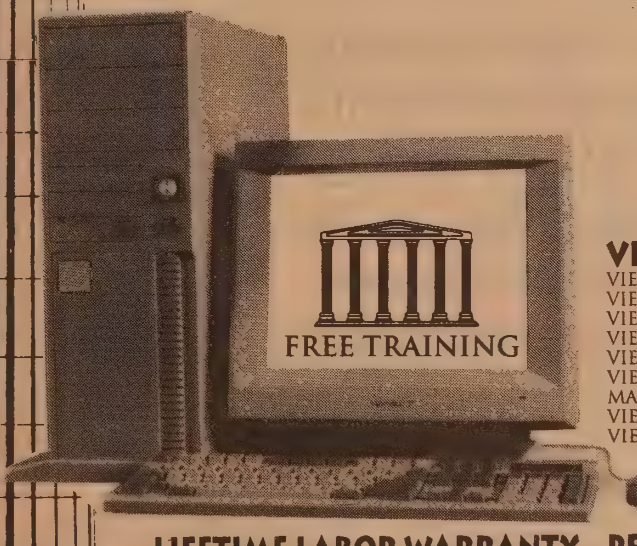

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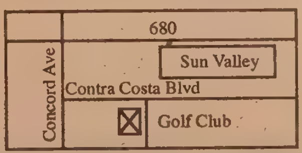

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Sony Electronic Book Player DD-10EX

BY MITSU HADEISHI

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About a year ago, Sony introduced the Data Discman Electronic Book Player, a handheld device which would play specially designed 3.5" CD-ROMs. More recently, Sony released an updated player, the DD-10EX, which has a number of improvements over the earlier model. In particular, the original Data Discman could only play CD-ROMs with the designation EBG (EB stands for "electronic book"), which contain only text and graphics, whereas the newer DD-10EX can play EBG and EBXA discs, which can also contain sound.

One could say this is the "multimedia" version of the Data Discman, although the graphics capability is quite limited (no animation, very slow drawing of graphics). (It does say "multimedia" on the machine's cover.)

The DD-10EX sells for about $500 street. It is quite portable; measuring approximately 4 3/8" x 1 3/4" x 6 3/8", the unit fits easily in the palm of the hand. It is too bulky to carry around in a pocket, however. Weighing in at 1lb. 3oz., it is a bit too heavy as well for that purpose. However, it is nevertheless quite portable, and one could easily carry it in a briefcase or purse for reference purposes.

It runs on AC power (with the included AC adapter), rechargeable battery (for 1.2 hours per charge using the included rechargeable battery), or regular battery (for three hours with the LCD backlight off, or 1.5 hours with the LCD backlight on).

PENS AND PALMTOPS

Included with the reader are three discs; Passport's *World Travel Translator, The New Grolier Electronic Encyclopedia*, and Ira Levin's novel *Sliver*, in audiobook format. All three include audio and pictures, though they are used to very different effect in the different discs. Each disc comes with its own "electronic book caddy," which looks something like a large 3.5" floppy disk housing. The difference is that you can remove the optical disc from the housing (for cleaning, I suppose). The housing protects the CD-ROMs from dust, dirt, and scratches. Though optical discs are generally very resilient, if a CD-ROM gets scratched it could become unusable, since one cannot afford major data errors in a text application (as opposed to an audio disc, where the player can often recover from a major data dropout with only a slight "blip" in the audible sound).

The primary advantage of the Data Discman is its portability. The success of this technology, therefore, will be dependent on the portable applications for the unit.

The screen is large enough to hold nine lines of text plus a menu line; each line seems to have a maximum of thirty characters. There is no speaker; sound is played through the headphone jack, and the unit comes with small headphones. There is also an external video jack, set up for both PAL and NTSC (PAL is used abroad, and NTSC is used here in the States), so you can use it abroad without any problems (it also comes with a video cable, conveniently enough). However, the video display is in black and white; unlike the Sony Multimedia CD-ROM player, the video in this machine looks much the same on the big screen as it does on the built-in display. The LCD display is a bit difficult to read, however, despite the fact that it is back-lit, so there is a reason to use the television instead if it is available.

PARLEZ-VOUS FRANÇAIS?

The *World Travel Translator* is an eight-language phrasebook. You cannot simply type in sentences and expect the machine to translate them; this is not a dictionary or an automatic translator, but merely a phrasebook.

There are two basic ways to look up a desired phrase. You can type in a word that appears in the phrase (for example, I can type "taxi" and find two phrases: "Where can I get a taxi?" and "Will you please get a taxi for me?"). Another technique is to search for a phrase by using the menuing system. For example, after selecting the desired languages, I then select "Travel," then "Road," then I page down a couple of screens and find "Where can I get a taxi?" I suspect that most people would tend to use the keyword search technique, since it is generally a lot more efficient. The menuing technique could become rather tiresome as the person you're trying to talk with waits for you to negotiate the menus.

The phrasebook is very limited in scope (among many other words, I tried to look up "translator," as in "where can I find a translator since the phrase I want isn't in this book!?," but no luck), but it does include sound for all of the translated phrases—you don't have to know how to pronounce the given language, you can simply repeat what is being said through the headphones (well, that is, provided you can repeat what you hear through the headphones).

The scope of the phrasebook is limited enough that you cannot use this as a dictio-

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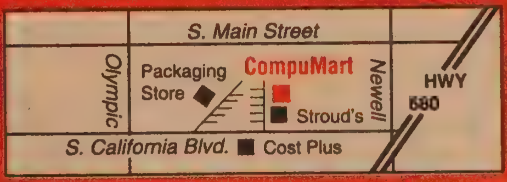

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nary. For example, for "book" the only translation phrase was "guide book," which in French is "un guide." In actuality, "book" is "livre" in French, but you'd never be able to find that out from this phrasebook. So, though this is a cute little CD-ROM, it is hardly comprehensive enough to be more than a curiosity while traveling. I suspect a good old paper phrasebook would be a lot more handy than this disc for this particular application. Of course, a paper phrasebook does not include audio translations of the phrases: that is a particularly useful addition in this "multimedia" version of the translator CD-ROM.

STUMP THE ENCYCLOPEDIA

The next electronic book I tried was *The New Grolier Electronic Encyclopedia.* This title was quite a bit of fun to play with. Though the encyclopedia claims to contain pictures and sound as well as text, in fact the vast majority of entries contain only text. This is understandable, as pictures and sound take up a huge amount of space compared to text. We didn't once stumble upon an entry with a picture or sound attached to it until we tried specifically to find one by looking up the keyword "sound."

Despite this, the encyclopedia seems pretty comprehensive. I had the Data Discman plugged into the TV and my wife and a friend of ours played "stump the encyclopedia." The encyclopedia contains very brief entries on most subjects, but they are usually informative. We were able to look up relatively esoteric things like some scientific terms (my friend has a degree in biology, and so we looked up a few he thought might be interesting—it had entries for some of them). We looked up the names of some obscure classical composers (my wife was a music major in college), and a variety of other mathematical and technical terms. Cultures other than European and American got short shrift, we noticed, but an encyclopedia can only cover so much material.

There were several search methods available. You could search by menu, by title, by keyword, or by "end word." The most useful method seemed to be the keyword search, though this sometimes came up with so many entries that you often had to re-do the search to cut down the number of entries a bit. You could specify up to three keywords over which to do the search. The Discman would then find all articles that contained the words you selected, either in the title or anywhere in the article. The other searching methods were not as useful, particularly the menu search, which involves finding articles by traversing a hierarchical menu system.

One problem with the searching techniques was that there was no way to search *within* an entry after you had found it. That is, you might find that the keyword search found a particular article you were looking for, but there was no way to quickly scan the article to find they keyword's location in the article. Often this wasn't a problem (most articles are quite brief), but sometimes the articles were long, and in those cases it was sometimes difficult to find the referenced word.

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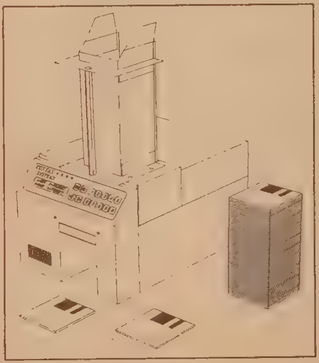

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COLUMBIA PICTURES PRESENTS

Finally, the unit came with the audiobook *Sliver,* by Ira Levin. This was pretty straightforward: someone reading the book aloud while text of the book is displayed on the screen at the same time, for some reason (perhaps this might be a way to help some people learn how to read). This is an example of Sony's cross-marketing strategy; they own Columbia Pictures.

The idea that Sony had in purchasing Columbia was to be able to link their "software" and their "hardware" businesses; Columbia Pictures could provide the visual "software" in the form of movies and other material, which could be played on Sony's current and new "hardware." This is one of the first examples of this strategy at work.

Unfortunately for Sony, *Sliver* didn't do as well as expected at the box office. I doubt this particular offering will drive very many sales of the Data Discman. However, it does demonstrate the fact that these little units can take advantage of compression to play full-length audiobooks. Since an audiobook can be much lower sound quality than a regular audio CD, you can record a much larger amount of sound, even on a 3.5" CD-ROM, than on a regular audio CD, so the Sony "electronic book player" is capable of being an audiobook player as well. Of course, to make this a viable application, there has to be a large number of audiobooks produced for the drive. If a large number of audiobooks were available, that might give people another reason to purchase the Discman.

> **One could say this is the "multimedia" version of the Data Discman, although the graphics capability is quite limited (no animation, very slow drawing of graphics).**

Of course, an audiobook is only as good as the person doing the reading, and one minor problem with this particular example of a CD-ROM audiobook is that the reader has a very flat, monotonic voice, which doesn't work well, at least for me, when I'm trying to listen to a suspense novel. Kind of deflates the experience. I think Sony should have hired a starving actor or someone with a little bit of vocal expression to read this particular novel.

Another minor annoyance: the "stop" button is on the front of the unit very near the cursor controls. As a result, it's easy to accidentally hit the stop button, which essentially suddenly powers the drive down. This occurred more than once while we were using the encyclopedia—which led us to discover one useful feature of having the text displayed along with the voice: you can find your place more easily when you start it up again.

MISC.

Finally, the Data Discman does play 3.5" CD audio singles. I'm not quite sure what the value of this is; I don't know too many people who have a large collection of 3.5" CD singles, but I suppose it's nice to know the machine can do it.

Overall, this is an intriguing technology with a lot of promise. To realize this promise, of course, will require a large number of titles. The encyclopedia illustrates that reference material can be quite effective in these small machines. Of course, one has to ask whether a regular CD-ROM drive installed in a computer would not be a better use of your hard-earned $500. In the latter case, you can use it to play multimedia games, access larger encyclopedias, and so forth.

The primary advantage of the Data Discman is its portability. The success of this technology, therefore, will be dependent on the portable applications for the unit. Travel and restaurant guides, more versatile and complete translation dictionaries and the like, I think, will be required for this technology to take off. Perhaps a large library of audiobooks wouldn't hurt, either. There is already a fair number of titles available even now.

NEWS TIDBIT

The portable multimedia CD-ROM unit I reviewed a few months ago (the Sony PIX-100) plays MMCD format discs (also known as CD-ROM XA). The Multimedia Publishers Group has announced that Compact Publishing is producing *CNN Newsroom Global View World Affairs Atlas* and the *Time Almanac* for Windows/MPC, Mac, VIS, and the Sony MMCD format. ■

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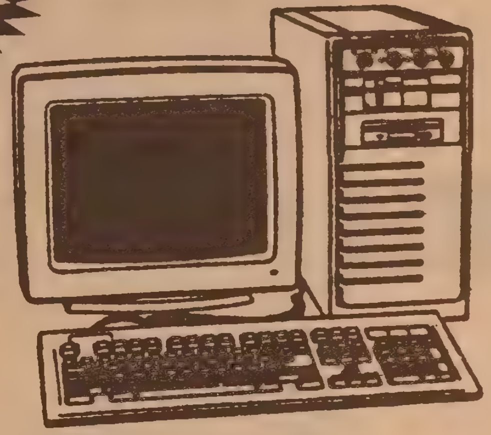

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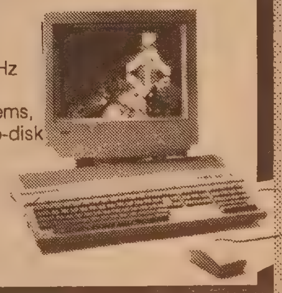

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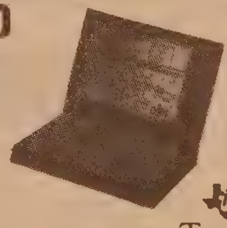

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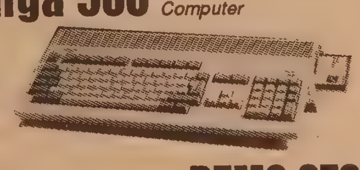

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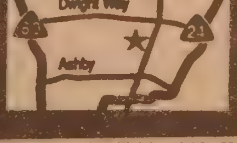

DOS 6.0—The Promise and Pitfalls

BY ED KAHN

RESOURCES:

Microsoft DOS 6.0, $129.95
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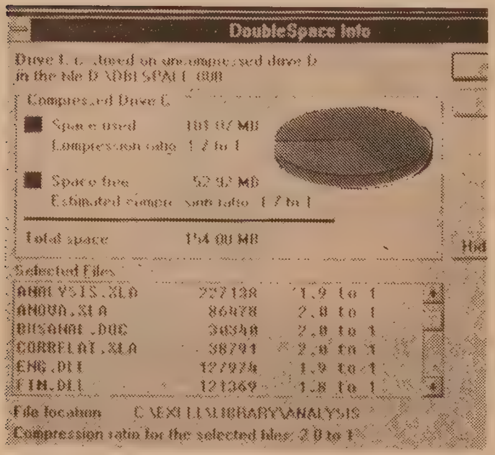
I eagerly await each new release of Microsoft's DOS, which generally includes a bag of goodies I've wished for for a long time. Sometimes the changes are major, sometimes merely superficial.

WHAT'S NEW?

DOS 6.0 held lots of promise, judging by the promotional literature. This latest version is filled with features that will be of special interest to users of laptops and portables. On the top of the list is a built-in compression feature that lets the user nearly double the capacity of the hard drive. While this technology has been available for years, it seems safer now that Microsoft has endorsed it and built it in as an option with DOS 6.0.

Next is memory management software that lets you get the most possible memory out of your system. This, like DoubleSpace, is really nothing new. But unlike earlier versions, this one is really simple to install and configures itself to suit your particular system. With Windows, it is especially important to use your memory efficiently.



DoubleSpace Info

Space used 101.07 MB
Space free 52.93 MB
Total space 154.00 MB

Selected Files
ANALYSIS.XLA 227138 1.9 to 1
ANOVA.XLA 86478 2.0 to 1
BUSANAL.DOC 34848 2.0 to 1
CORRELAT.XLA 38791 2.0 to 1
ENG.DLL 127974 1.9 to 1
FIN.DLL 121369 1.8 to 1

File location C:\EXCEL\LIBRARY\ANALYSIS
Compression ratio for the selected files: 2.0 to 1

There are a host of less important additions which are, nevertheless, convenient: a backup utility that actually works; a more sophisticated undelete feature that lets you recover directories as well as files; a defragger that works even if you have used DoubleSpace; a virus protection program that identifies and removes viruses. You can sign up for updates that will keep the program effective against new viruses. A file transfer program is especially appealing to laptop users, as is a module that automatically conserves a laptop's power when using programs that are written to Microsoft's Advanced Power Management specifications.

A few small touches round out the package. Microsoft has now included the ability to set up your system with multiple config.sys and autoexec.bat files. I've done this for years with standalone programs because as systems became increasingly complex, it was nice to be able to have the option of turning on the computer with a stripped-down system leaving out everything but the bare essentials. Another use for this feature is to have one set of files designed for using Windows and a different set for working within DOS.

A final detail that I appreciated was the ability to either bypass or selectively accept your config.sys file. In DOS 6.0, this is done by pressing the F5 key or the F8 key. F5 bypasses both the config.sys and the autoexec.bat files while the F8 key asks you to either use or bypass each line in the config.sys file. This lets you effectively isolate problems, and is a real time saver when you're having system problems.

A number of things have been done to make this product available to novice users. The first thing is that the documentation has been simplified in order to make it user-friendly. Gone are the detailed descriptions in technobabble comprehensible only to the most sophisticated users. Examples of how to set up a file or follow an instruction are provided. It is really a refreshing change from the earlier Microsoft literature.

But, nevertheless, there are problems. Perhaps DOS has simply become too complex. I read through the documentation before beginning installation. Instructions are sparklingly clear. If you follow the steps outlined in the accompanying literature, you will have no trouble installing this latest version of the operating system.

It all went like clockwork until...

READ ON!

You are advised to back up your system before beginning. Once you begin, it is really simple to install the new operating system.

In my case, I got a warning right off that I had to remove some files in order to make more room on the hard drive, as several megabytes of disk space are required for the conversion. DOS 6 needs room to save your old DOS files so you can restore your old operating system if things don't work out right. You will also need to have a floppy disk or two so DOS can copy certain files you'll need if you have to go back to the old operating system.

I followed all of the precautions and everything worked fine. After I saw that everything was going well, I decided to try DoubleSpace. Clear instructions are given for installing this option. When the operation was complete, I had something like 147MB of hard disk space instead of 80MB.

As I began to work, I first noticed a problem when I tried to use one of my DOS applications from within Windows. There was some kind of memory problem, so I decided to use the memory manager. Running MemMaker is as easy as can be. If you choose the express installation option, there is nothing to do except hit the enter key a few times and watch the program do everything for you. I tried this, but my problem was still there. So I then tried the custom installation option, which is only slightly more complicated. But the problem still persisted. And things had gotten a little worse.

Now, when I booted up, I got the opening screen of Windows and was then thrown back to the C>. Nothing I could do fixed the problem. I finally spent an hour on the phone with Microsoft customer support. Nothing they suggested helped either.

In the end, they asked me to fax them four files. In time, they had a few more suggestions, one of which kind of worked—it worked, but my access to expanded memory was permanently denied. That doesn't make any difference in Windows applications, but it may limit me in some large DOS programs.

I don't know whether this is a problem with my hardware or the operating system. But what I do know is that after installing DoubleSpace, it is nearly impossible to go back. Once that option is installed, the only way you can get back to your old system is to reformat the hard disk, reinstall your old version of DOS and then restore all of your backed up files. Quite a job! Don't install the DoubleSpace option unless you are sure everything is working properly as there is no simple way to turn back.

continued on page 122

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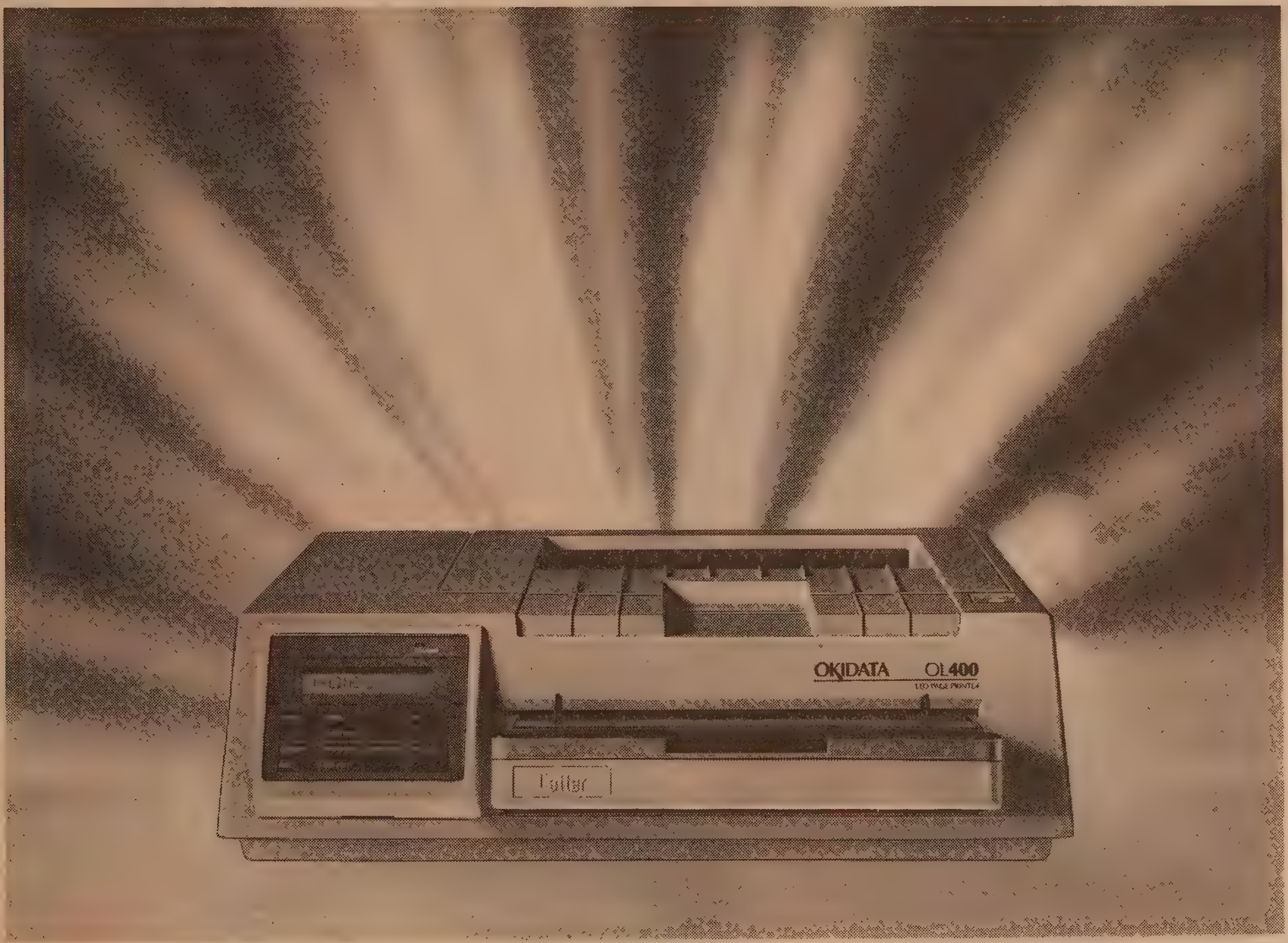

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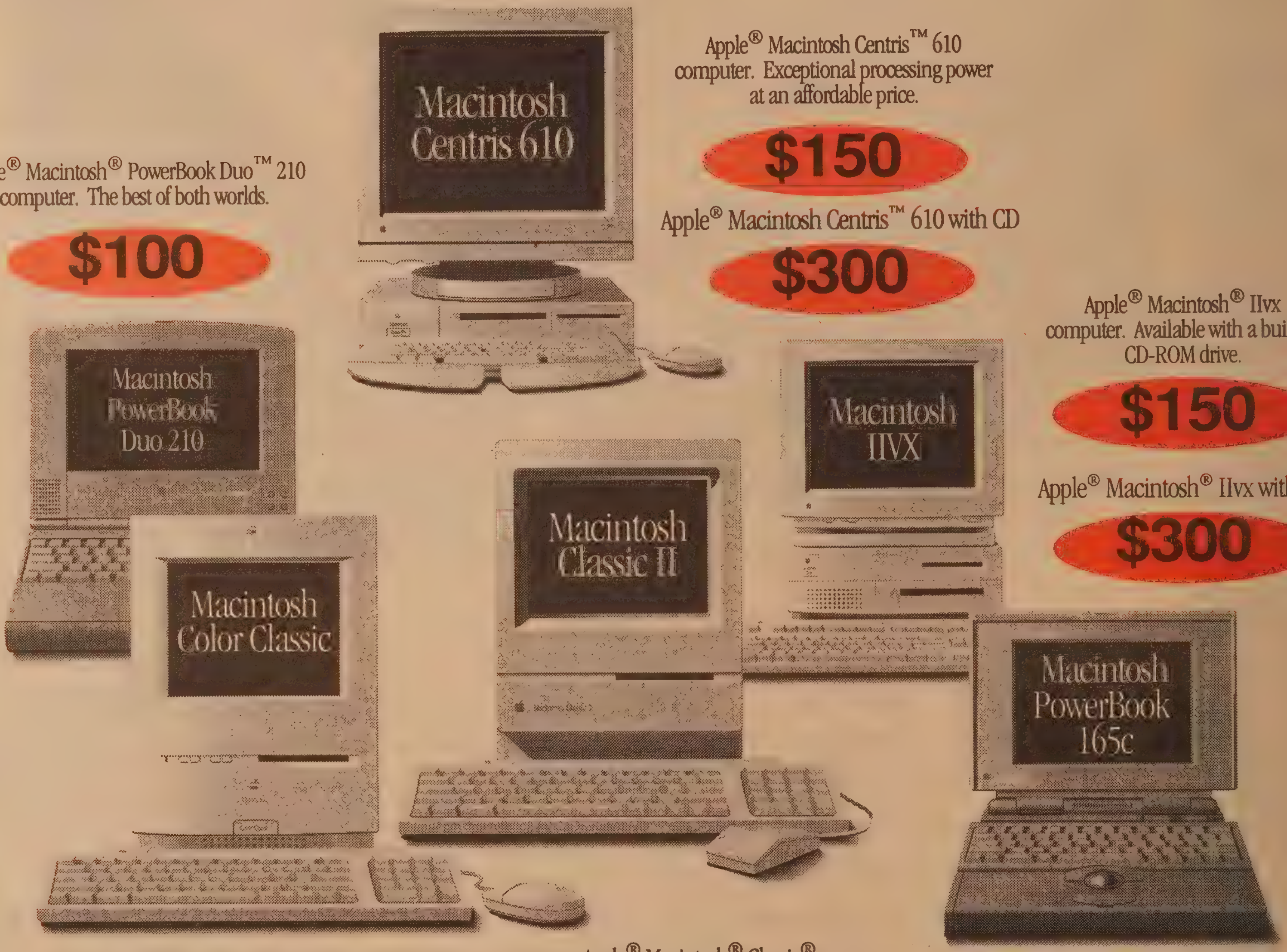

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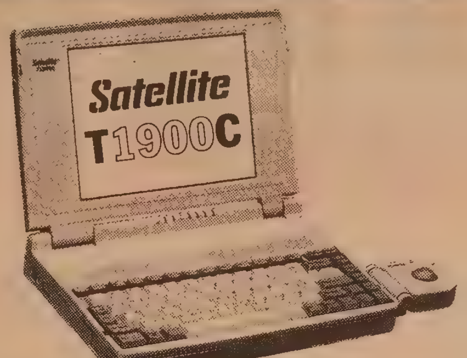

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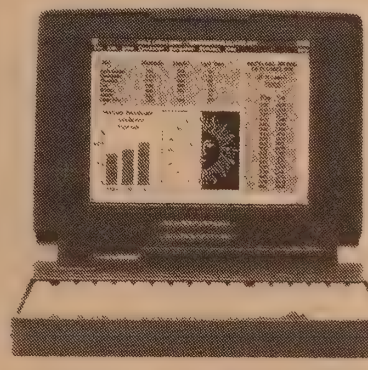

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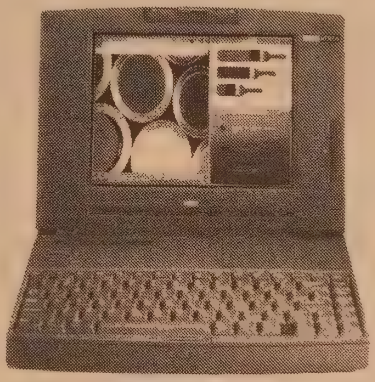

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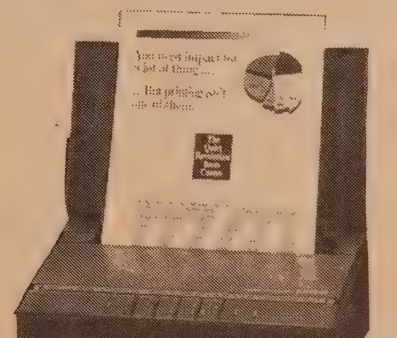

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Telecommuting Spawns New Jobs

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BY ROBERT MOSKOWITZ

With some 6.6 million full-time employees accomplishing a regular portion of their work through "telecommuting," it's clear to almost everyone that the principles of telework can be applied to a wide range of existing jobs. What's only now beginning to be noticed, however, is that the advent of telework will itself accelerate the creation of some totally new job descriptions. The one gaining widest acceptance and most clearly worth knowing about right now is the Technographer.

> THE ADVANTAGE TO BECOMING A QUALIFIED TECHNOGRAPHER IS LEARNING HOW TO MAINTAIN ONESELF AS AN EFFECTIVE COMMUNICATIONS CHANNEL AND COORDINATOR FOR THE GROUP WITHOUT TAKING OVER TOO MUCH.

Basically, a technographer is a trained facilitator of the communications and thought processes that take place at meetings. The Technographer's primary tool is a computer with a display screen that everyone in attendance can see.

To understand how a Technographer works, imagine that you're having a telephone conversation with another person and that, to keep track of what is said, you take notes by typing into your computer the ideas expressed and sometimes the exact words spoken. Further imagine that you send a copy of these notes to the other person several times during the conversation. Each time you send the notes, the other person has a chance to modify and verify what you've typed. He or she also has the opportunity to better understand where the conversation has come from, and thus where it is going and what work ought to be done as a result of it.

This note-taking and note-sharing process increases the functionality of the conversation because seeing the information in black-and-white helps people clarify and improve their own thinking about what is being said, and also because both parties can now leave the conversation with the same set of notes and understandings. Technography offers these benefits not just for two-party conversations, but for work-group meetings of almost any size. It allows every participant to see the impact of their individual input and maintain their alignment with what other people have already said.

Large corporations and small businesses are already taking advantage of Technography to improve the effectiveness of their meetings. At Knight-Ridder and Great Western Bank, it's used regularly to facilitate meetings and planning sessions. At Apple Computer, Director of Human Resources for Macintosh products Jim Cutler acts as his own Technographer to facilitate his team's weekly meetings. Ross Perot's firm, EDS, has for years given its meeting facilitators the title "Technographer," and has built several Technography centers that amount to electronic turbochargers for meeting facilitation.

While Technography greatly improves productivity and effectiveness for face-to-face meetings, its real beauty lies in the ability to facilitate teleconferencing, video conferencing, and computer conferencing—the exact types of remote meetings that routinely take place when some of the people in an organization telecommute. Instead of throwing the notes and ideas up on a single screen where people at one meeting site can see them, a Technographer can use relatively simple, proven technology to display the meat of the meeting on video screens at two, three, or more sites, helping people at any one location make a closer connection with the people at the other sites. For telecommuters' telephone conversations, a simple fax of the notes several times during the conversation serves the same purpose. Technography becomes the next best thing to being there because it greatly improves the immediacy of the meeting for people who happen to occupy different locations.

Technography is so well established as a job description for the telecommuting age that the Institute for Better Meetings, based in Palo Alto, CA, has begun to offer a two-day certification program in this new set of skills. It's even possible to become a bilingual Technographer.

According to Bernard DeKoven, a seminar leader and consultant at the Institute, the developer of the Meeting Meter software,

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Robert Moskowitz is a business consultant based in Woodland Hills, CA, who writes frequently on productivity, office automation, and technology.

author of *Connected Executives*, and an expert on the collaborative process for business executives, the real advantage of becoming a qualified Technographer is learning how to maintain oneself as an effective communications channel and coordinator for the group without taking over too much (a problem even for people working a chalkboard in front of a group).

"You must learn how to play a certain role in the group and facilitate the group process without dominating it," says DeKoven, "which is why the role of Technographer should rotate within the group, just as in ancient times people would take turns acting as scribe or timekeeper for a certain part of a meeting in order to facilitate progress for everyone."

If the Technographer—or anyone controlling the notes and the feedback process in the meeting—records the ideas that people express without using their exact words, DeKoven explains, people quickly lose ownership and interest in the meeting. It's far better for the Technographer to keep asking questions, on the order of: What should I type now? Do you want me to change it? Do you like it better this way, or that way?

TECHNOGRAPHY IS PROVING ITSELF AN EFFECTIVE MEANS FOR IMPROVING THE TOTAL FLOW OF INFORMATION THROUGHOUT ANY WORK GROUP, PARTICULARLY WHEN TELECOMMUTERS ARE INVOLVED.

Repeatedly asking these questions makes people in the meeting—those directly in the room as well as telecommuters or others connected electronically from remote locations—think more carefully about what is being said, and why. Sometimes, of course, it's appropriate just to have a conversation where people exchange ideas. But when people meet or talk with a clear purpose, it's also appropriate to shift into a different mode, a work mode in which people commit their ideas to writing. Creating such a document is not the ultimate purpose of the meeting, of course, but it becomes the tool to support and corroborate the communications, the decisions reached in the meeting, and the action items to follow.

"In terms of collaborative process," says DeKoven, "Technography is a powerful facilitative intervention." As people grow more comfortable having a Technographer around, he or she can become far less visible or intrusive. People quickly learn how to get their ideas up on the screen, and how to work with what else is up there. They become skillful at conducting Technography-based discussions, working from the screen or printed notes and controlling the process. It turns out that people need very little exposure and training to make good use of Technography for face-to-face meetings or for electronic ones.

Learning how to function as a Technographer, in turn, helps individuals contribute more to the group process. For one thing, temporarily functioning as the group's Technographer gives each person a chance to share with the group how he or she uses the computer. It effectively converts your personal screen into a team screen. For example: you may elect to use the Table Tool in Microsoft Word, or a table made within a spreadsheet to show the pros and cons of a particular plan of action or item of disagreement. As everyone contributes to the drafting and subsequent rewording of the pros and cons, people who fundamentally disagree subtly shift into a collaborative mode, and begin cooperating to define the basis of their disagreement. From there, it's often a relatively short step toward collaboratively developing a compromise solution that people on all sides can support.

Technography began as a tool for dealing with words, but it works equally well in dealing with numbers, calculations, and data analysis—in fact, for any work that can be accomplished in a meeting. By shifting from a word processor or text outliner to a spreadsheet, for example, the Technographer can help participants create a business model, refine a financial analysis, or do collective "what if"-ing in support of their decision-making process. By shifting to a project-management tool, the Technographer can help the group organize how they and their subordinates are going to work together toward a common goal, how they are going to utilize and share resources, and when and how they are going to schedule their time and efforts to maximize the collective group output. By working with a data manager and a database of business information, the Technographer can provide immediate answers to basic questions, and help focus discussion on concrete facts rather than speculation.

In fact, Technography is proving itself an effective means for improving the total flow of information throughout any work group, particularly when telecommuters are involved. Through Technography, electronic participation in a meeting is not the usual arm's length challenge. Each person leaving a Technography-supported meeting can go back to his or her desk with all the documents, analyses, and projections created there, ready to evolve them further individually. These refinements can be quickly and frequently communicated with others through email, file sharing, or facsimile, setting the stage for relatively rapid progress at the next face-to-face meeting.

Traditional meetings tend to be very isolated because people fall out of touch, and forget a great deal of the detail from one meeting to another. But keeping the ideas alive via intra-group communications makes each face-to-face meeting clearly a continuation of the work process. As before, people take up at one meeting where they left off at the last, but now they have several new streams of information to weave the two meetings together.

According to DeKoven, the live face-to-face meeting is quickly becoming surrounded and supported by a variety of communications experiences, including contact with telecommuters from remote locations. This gives such meetings a special importance above and beyond the need to pass along information or agree on a course of action. In today's environment, face-to-face meetings are focusing more on the unique things people can accomplish in a live encounter that they can't do over electronic connections, such as: develop and deepen the connections and the trust so necessary for ongoing collaboration, and understand and appreciate the differences and specialties that each brings to the work group.

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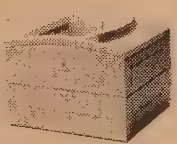

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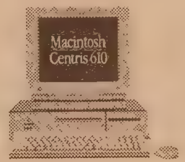

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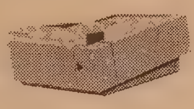

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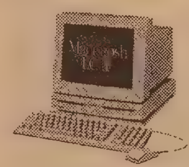

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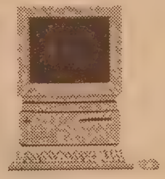

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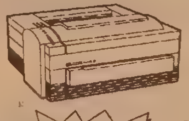

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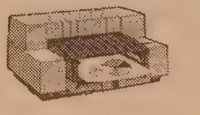

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Although computer-assisted Technography is a powerful method of enhancing both live and electronic meetings, it is equally important to know when to turn off the computer screen. Temporarily freezing the system helps validate that the communications process is shifting from "on the record" to "off the record," from concrete formulations to blue sky thinking, and so forth. While the Technographer should not be the one to initiate such a shift, his or her recognition that the shift has taken place lends extra freedom to speculate at certain times, and extra meaning to the work accomplished when participants come back "on the record."

There tends to be three phases of results-oriented meeting activity where adding Technography improves productivity and impact—phases that DeKoven calls "Collect, Connect, and Correct." In the first or "connect" phase, people contribute a great many ideas regarding a problem and/or possible solutions. Technography provides a very powerful tool for recording the many fleeting ideas that may be rapidly expressed. In the second or "connect" phase, meeting participants begin making connections between the previously listed ideas—organizing and categorizing them in what should be a collaborative process. Here, Technography harnesses the power of computers to re-sort and redisplay information with minimum effort. And by creating a display visible to everyone, including telecommuters and teleconferencers at other sites who are attending the meeting via voice and electronic data links, it enhances the potential for collaboration and consensus. In the third or "correct" phase, meeting participants refine and polish the raw ideas. Here, Technography gives everyone an opportunity to offer changes to the group, not only facilitating the refinement process but helping everyone "buy-in" to the final results.

In a remarkable synergy, telecommuting is not only offering solutions to problems associated with more traditional patterns of work, it is supporting a whole new range of technologies and techniques—including new skills like Technography and underrated supervisory styles like management-by-objectives—that can be applied to telecommuters and nontelecommuters alike in a bid to increase the productivity and participation of everyone in the organization. ■

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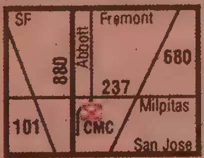

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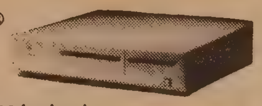

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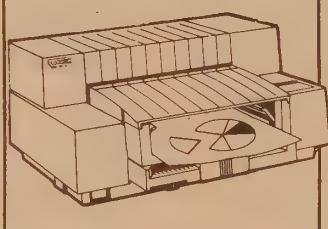

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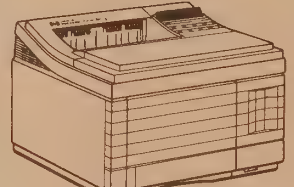

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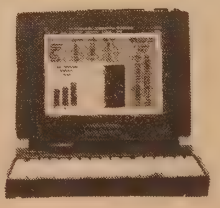

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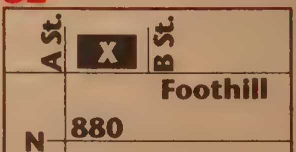

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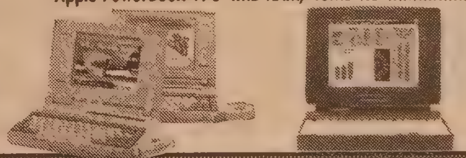

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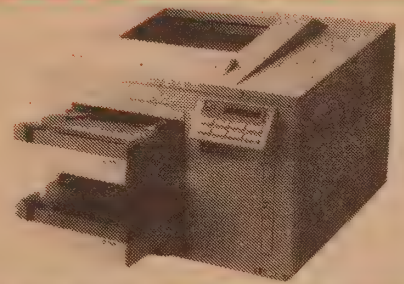

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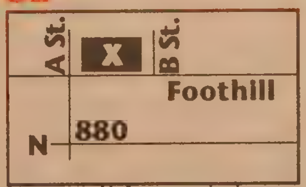

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Microsoft At Work

Or, Quiet, Please. I'm Talking To My Copier.

BY YACCO

LANS

If you haven't yet heard about the Microsoft At Work Architecture, it's probably because you haven't read a business magazine or newspaper recently. Trust me, Microsoft's new architecture for the workplace is getting covered everywhere. And it should be. Something like it will definitely be in your future.

Simply put, Microsoft At Work is a plan to network office equipment. Not just computers, routers and hubs, mind you, but everything in your office, except the stapler and your secretary. You'll eliminate a lot of paper. Not all of it. That isn't the goal, says Gates. But you'll be able to eliminate much of the duplication required to disseminate information once it's received.

Microsoft is important to this, of course, because something like a workplace architecture needs a leader. Without a standard to bring them together, the hardware players probably wouldn't do it. Each would be more likely to get into all the product lines itself, and push the others out with proprietary protocols. It's unlikely that a group of them could cooperate on its own. And even if giants like IBM succeed in offering a proprietary solution, single-vendor solutions don't make sense for customers anymore. Most would be leery of the benefits. No vendor can do everything best. And no customer could be comfortable giving so much control to one company.

Microsoft's plan is to put many hardware vendors together with a standard. That's still a tall order. Fortunately, with Microsoft behind MAW, there will be a high level of belief in it. And if the industry believes in something, it can work.

Just consider CD-ROM as an example. A few years ago, I was repeatedly rebuffed by editors whenever I proposed writing about CD-ROM. They all claimed that forthcoming read-write optical technology would eclipse it. Users undoubtedly would prefer it to read-only devices, they reasoned. If that had remained the prevalent belief, CD-ROM might have languished. However, Microsoft understood the attraction CD-ROM held for publishers, and pushed it by establishing an industry conference. Publishers, armed with confidence in the technology's future, were able to take advantage of the medium's read-only character to produce electronic publications with which they felt familiar and comfortable. CD-ROM slowly sailed out of the doldrums, built up speed, and flourished. These days, I review juke boxes full of CD-ROMs, and Microsoft's plans are more influential than ever.

MAW AT WORK

Once MAW brings the necessary players together, you'll have more than a network. You'll have more than a choice among various telephone equipment, copier, fax, and other product vendors. You'll also have Windows. This initiative comes from Microsoft, so naturally, MAW is tied to its favorite operating environment. And Windows, or the appropriate portion of it, will for the first time empower users of complex office systems. Microsoft envisions, for instance, a visual point-and-touch interface for complicated telephone services such as transferring, conferencing, and voice mailing. But a new interface isn't the only importance of MAW, even though that's the part on which Microsoft will concentrate.

What's also vital is the physical infrastructure that MAW will create. It's the ports and protocols that will let you connect the telephone, copier, fax, portable handheld devices, and perhaps even the postage meter, to your desktop computer. Once MAW's infrastructure is in place, any software might be able to exercise control through it. And that control need not be limited to today's office equipment. It can extend to new devices that will be defined by this enabling technology. It doesn't have to be an application under Windows either—it can be microcode in a chip.

If MAW follows the evolution of the LAN, it will begin by connecting resources, just as early LANs did, for improved access. The interface itself improves access in a sense. Other computer resources can also be shared with office machines. Why have separate memory for your fax, for instance, when there are always unused bytes somewhere on the network? Formats and fonts will be standardized between devices with the Microsoft At Work rendering portion of the architecture. Microsoft calls it "What You Print Is What You Fax Is What You Copy Is What You See." Documents will be accessible through off-the-shelf applications too.

Eventually, MAW will foment hardware evolution just as LANs have with computer resources. For instance, LAN users have reduced the number of hard disks and printers they need. In the case of MAW, there will no longer be a reason to duplicate all the functionality of your office machines. You won't need both a printer and a copier, which is basically a print engine and a scanner. Digital printers can be adapted to both. And if your digital scanner can then be used for copy functions, there's no reason why you can't also use it for inputting hard copy to your fax machine. Come to think of it, once you eliminate its printer and scanner, the fax is reduced to a modem. Furthermore, given a modem's telephone connection, you should be able to use your multimedia video digitizer for video conferencing applications. Video conferences can also share your multimedia sound system.

In other words, all your communication devices can be separated into their individual functions, and each function redesigned as a module that attaches to the network. The computer's role will be to dynamically configure them as required for the various tasks you do. This isn't part of MAW now, but it could be if vendors redesign these products.

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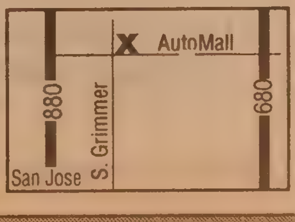

Such changes would, in turn, give rise to new work habits just as conventional LANs have brought about today's new workgroup models. In a system like this, increasing workloads and distributed work points can be handled by adding additional modules. It won't be necessary to add a print engine everywhere you need a scanner for faxing or copying. Most of the remaining print engines can be located for routine, and cost-effective, central distribution. Many intercompany communications can replace paper altogether with email.

> Microsoft envisions, for instance, a visual point-and-touch interface for complicated telephone services such as transferring, conferencing, and voice mailing.

BUT WAIT, THERE'S MORE...

This change will produce huge benefits, principally lower equipment and variable costs. But that isn't all. Modular technology will require less space, reduce cooling requirements, and eliminate the pollution that would have been created by elided units. Centralizing intelligence and breaking devices into modules can also raise quality and functionality to uniform levels. For example, sharing a modular print engine will uplift the quality of faxes to that of other office documents. And in terms of computing power and storage requirements, special fax functions such as broadcasting and polling have very modest requirements. On a standalone fax, they require adding memory chips and intelligence at extra cost. On a communication-enabled network, they may only require the software.

In fact, the intelligence for faxing, telephony (including video conferencing), copying, video, sound, compression, and other communication functions can all be put on a network-adapter card and slipped into every PC. Need video input for digitizing images and conferencing? It'll be in there. Need MIDI, voice-, and digital-sound processing? It'll be in there too. And if Intel can put a pair of i486s, a coprocessor, a couple of caches, and all the Pentium's pielining logic into one chip, there's no reason why all this functionality can't also end up in a single communications chip. Like the very first PC networks, Microsoft At Work is just a beginning. ■

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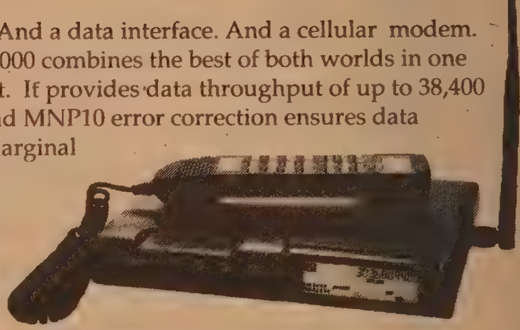

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Why Retype Existing Documents?

Its late at night. Everyone is sound asleep. ...Except you. You are still typing away trying to finish the reams of data that must be entered by tomorrow. How you wish you have listened to your computer dealer and bought something - like a scanner - to help you out!

The question is not how fast can you retype a document but rather is it worth the time to retype that page? There is a solution, a machine that can completely retype a document ten times faster than doing it by hand. This solution is very affordable especially if you already have an IBM 386/486 computer. All you need is a full Page Scanner and quality OCR (Optical Character Recognition) software. Currently, the most affordable solution is the ScanPlus Grayscale Package from Plustek ($599).

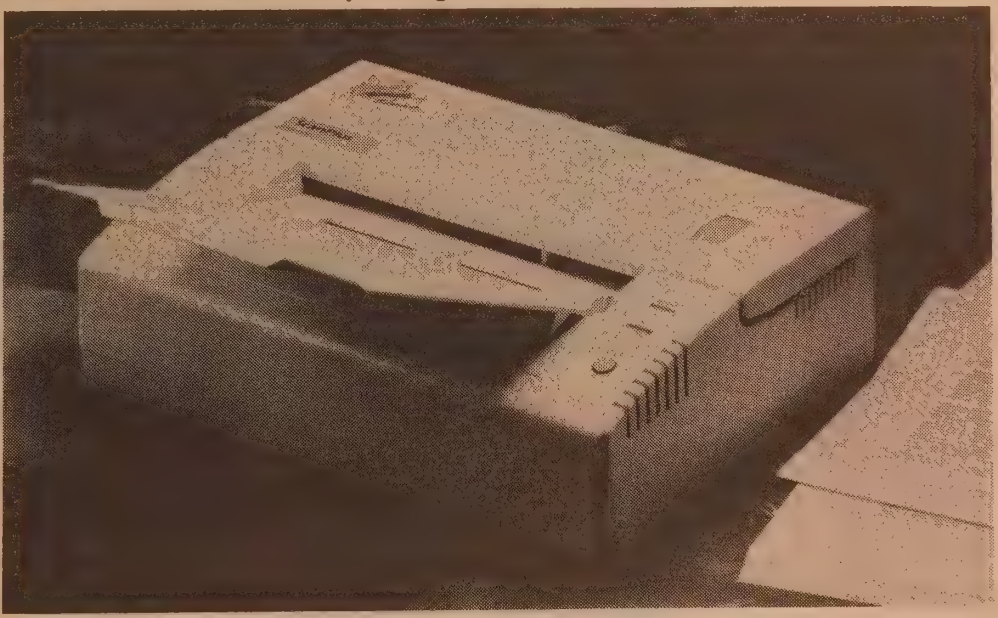
The First Essential Tool: A Scanner

Scanners, generally known as the eye of the computer, are optical devices that read graphics into the computer. First, it reads the image by illuminating the paper. Blank or white spaces reflect more light than inked or colored letters or images. A lens than focuses the beams of light onto a light-sensitive CCD (charged coupled device), and the diodes translate the amount of light into an electrical current. An A-D converter stores each analog reading of voltage as a digital pixel representing the actual image. Until passed through the optical character recognition process, this group of dots is meaningless to a word processor as far as editable texts are concerned.

The Second Essential Tool: An OCR Software

OCR is designed to handle documents with multiple columns, wide range of character sizes, and documents in various orientations. When OCR reads in images created by the scanner, the software block off paragraphs, columns, headlines, and random graphics. It evaluates the layout of the page and saves important formatting information. The white space between lines of text within a block defines each line's baseline, an essential detail for recognizing the characters in the text. Different type of OCR software use different means to determine which shapes constitute the various characters and numbers. Omnipage Professional and WordScan by Calera provide *omnifont* solutions. Both can recognize virtually any typeface used in business and legal documents, newspapers and magazines, books and brochures.

Merely finding characters on the page is not enough. OCR programs will also invoke a specialized spelling check to search for obvious errors and locate possible alternatives for words that contain tagged unrecognized characters. Uncertain characters and words are marked and highlighted in the recognized text verifier windows to allow users to recheck. For example, the double "s" in the word "miss" would not be mistaken as a double five's (i.e., mi55). This increases the accuracy of the resulting document.



A respectable ScanPlus ADF Gray 600G from Plustek.

When the OCR Finishes Processing...

When the OCR finishes processing the documents, it gives the option of saving the converted document into any desired text format for word processors or spreadsheets. Leading OCR software generally includes more than thirty commonly used text formats. Some even contain the option to scan and recognize documents, and then have the recognized text inserted into your word processing document at the cursor position.

The Ultimate Office Scanner, and Its Suppliers

The ultimate office scanner should be a low end, affordable, full page, desktop scanner. Quality sheetfed scanners fit best into this category. These scanners, generally smaller in size, are designed to provide flexibility and portability with an emphasis on ease of use. Unlike flatbed models, one need not lift and lower lid to insert the document. Therefore, one can easily see if the originals are aligned correctly without the need for a preview scan in the case of flatbed scanners. The only drawback is that users may not be able to scan images from books without first photocopying the page. Flatbed types, originally targeted towards graphics art professionals, are sometime used in offices. They generally produce higher quality images, but usually at an unaffordable price. Though they have fewer limitations on originals and may scan images directly from books, they generally have large footprints and can be quite challenging in aligning the originals. When equipped with optional automatic document feeders, flatbed scanners can combine the automation advantages of sheetfed scanners. Quality sheetfed scanners are currently produced by IBM (Easy Option), Plustek, and Info Products.

The Point

For anyone who cannot afford to spend time rekeying existing documents, scanners provide one worthwhile solution. Other solutions created for office scanning include computer based filing and retrieving, faxing, Publishing and Image Editing, Presentation, and Image Database.

For additional information on quality scanners and their applications, call Plustek at (408) 980-5183.

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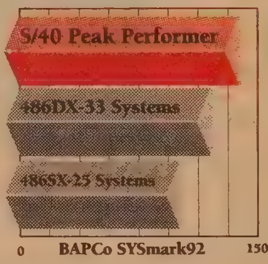
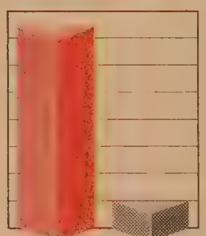


Cyrix 486S/40 based systems outperform 25 and 33 MHz 486DX and 486SX systems - even those costing hundreds more.

Blazing VESA Graphics



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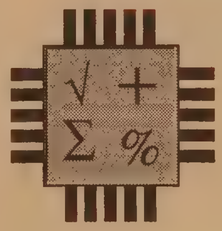

The Cyrix 40 MHz 487S math coprocessor dramatically increases the performance of business math software like 1-2-3, Excel, and hundreds more.

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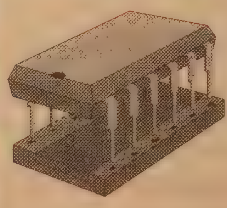

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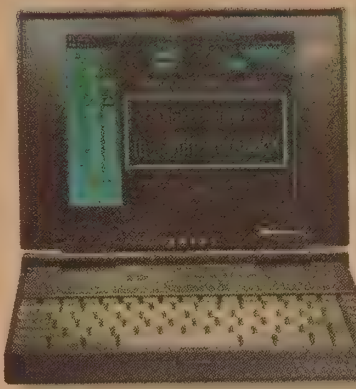

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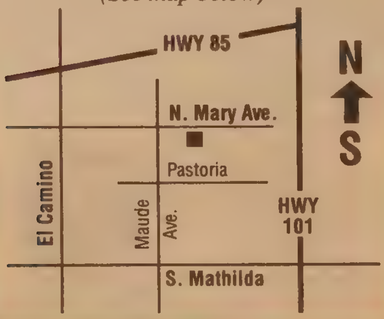

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OS WARS REDUX:

The Strategy Of Software Evolution

BY BENNETT FALK

UNIX

Culture is a strange thing. Software is sold (and occasionally bought) on the strength of claims that it is new, open to the future, and capable of evolving. At the same time, the people who buy and sell software are part of a culture that, from Barney to *Jurassic Park*, is deeply preoccupied with the old and extinct.

Even in extinction, dinosaurs are awfully substantial, and it is difficult to ascribe much significance to words like "open" or "new" when they are applied to technology. The best they can mean is "not easily rendered obsolete," but as the dinosaurs found out, fending off obsolescence is a matter of adapting to something that no one expected in the first place. What features can any software manufacturer point out to demonstrate the adaptability of their software to the unknown? It might be easier to persuade people that extinction is not forever after all, and that obsolescence isn't as final as it looks at first glance.

We seem now to be at a turning point, an evolutionary step in which the known and settled past turns into an uncertain future. The long-awaited UNIX/Windows NT competitive battle has finally been joined. Why, you may ask, are these products competitors? In part they have become competitors because their respective markets have begun to collide.

WORLDS COLLIDE: NT MEETS UNIX

UNIX has been the operating system of choice for two classes of computers: workstations and servers. Workstations are high-performance "individual user" computers, used for software development and in various computation-intensive fields. Servers are larger computers providing access to some large store of data or the ability to coordinate complicated transaction processing requests.

These two classes of computer are often linked in the same network. The networks in which UNIX flourishes are used for high-speed data retrieval and distributed transaction processing.

The dream of an integrated solution for all the computer needs a business might have is compressing the desktop and server/workstation worlds into one market. And in that market, Windows NT and UNIX will be competitors.

Windows NT is the descendant of the operating systems of choice in the personal computer, or desktop computer, market. Desktop computers are the jack-of-all-trades business machines that have replaced typewriters and adding machines in the modern office. Word processing, spreadsheet analysis, and the kind of database browsing managers do are not tasks that require a lot of computing power. They may need lots of memory and lots of disk space, but they don't really need many MIPs (millions of instructions per second, a general measure of a processor's computing power).

Networking is also common among desktop systems. But the object of linking desktop systems in a network is not usually transaction processing. It is more likely that desktop systems will be networked to share hardware resources (disks or printers) or to facilitate communication among users.

It is not unusual for businesses to depend on all three types of computer, and the need for integrating the management of all a business's computer resources has fostered the notion of "enterprise" computing. The dream of an integrated solution for all the computer needs a business might have is compressing the desktop and server/workstation worlds into one market. And in that market, Windows NT and UNIX will be competitors.

Now from the very start, this is a strange competition: each side has to make quite a reach to engage the other. Most of the UNIX vendors are hardware companies. They bundle UNIX with their hardware, and they adapt the operating system to show off their hardware to its best advantage. In a very good year, one of these vendors might sell two hundred thousand machines.

Microsoft has a completely different business profile. It is almost exclusively a

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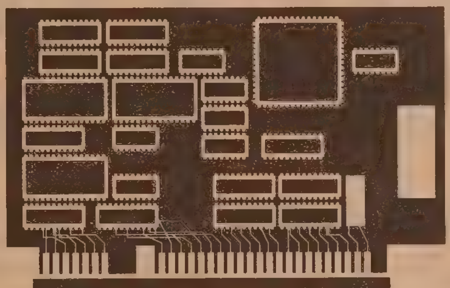

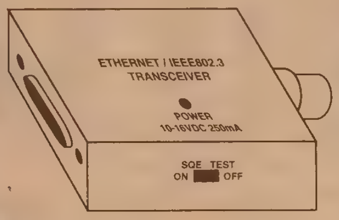

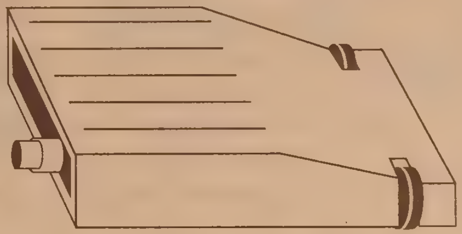

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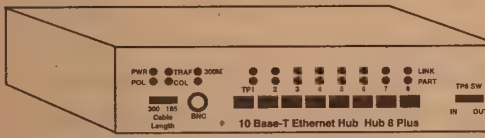

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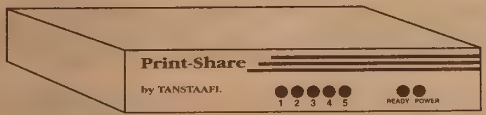

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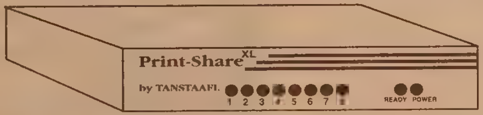

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software company, and its products sell in much higher volumes than those of the UNIX vendors. Most of Microsoft's current product line is for Intel-based computers (now fashionably referred to as "x86"). More than twenty million copies of Windows have been sold since 1991, but with more than one hundred million personal computers in use, there is still room for growth.

> **To address the issues of enterprise computing, the software must be more than good: it must also support the standardization that the business market seems to crave.**

STRATEGIES FOR WORLD DOMINATION

Each of the contenders for the attention of the enterprise computing market has a strategy. On Microsoft's side, the strategy is twofold. Windows NT promises more sophisticated facilities for device management and connectivity than have previously been available for the x86 class of computers. If Windows NT is very good, it will make mass market x86 hardware more competitive for the server and workstation roles that have traditionally been held by the UNIX vendors' hardware lines.

The second component of Microsoft's enterprise computing strategy is to promote Windows NT for architectures other than x86; the first phase of NT development does indeed include versions for computers with the MIPS R3000 and R4000 chips and the new DEC Alpha processor.

This strategy is not without risks. Software alone will almost certainly not make generic x86 hardware the equal of the hardware offerings of the UNIX vendors. However, Windows NT can close the gap, and it is anyone's guess how much gap-closing is necessary to make Microsoft's approach to enterprise computing the preferred solution.

The porting of NT to other architectures will face the same problems that have traditionally faced UNIX vendors: Will enough applications be ported to the new platform to make it attractive to users, and will the vendors of NT on these platforms offer adequate support?

For their part, the UNIX vendors seem to have two strategic options. On one hand, they can exploit UNIX's excellent network connectivity. The UNIX world's standard-

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5	6 TCP/IP UNIX/USER	7 TCP/IP UNIX USER	8 UNIX SYS ADN IN	9 UNIX SYS ADN IN
12 UNIX SYS ADMIN	13 NET TECH	14 3.11 SYS MGR	15 3.11 SYS MGR	16 3.11 SYS MGR
19 0S/2 3.11 CNA •E	20 3.11 CNA •E	21 3.11 ADVS MGR IBM LAN SVR3.0	22 3.11 ADVS MGR IBM LAN SVR3.0	23 3.11 ADVS MGR IBM LAN SVR3.0
26 3.11 CNA •E	27 3.11 CNA •E	28 3.11 to 4.0 UPDATE	29 3.11 to 4.0 UPDATE	30 3.11 to 4.0 UPDATE

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16 OS/2	17 OS/2 TCP/IP •E	18 IBMLANSVR3.0 TCP/IP •E	19 IBMLANSVR3.0 NFS •E	20 IBMLANSVR3.0 NFS •E
23 3.11CNA •E	24 3.11CNA •E	25 3.11 to 4.0	26 3.11 to 4.0	27 3.11 to 4.0
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ization on the TCP/IP protocol suite for networking is an advantage, as is the emergence of products (LAN Manager for UNIX, for example) to bring other protocols into the UNIX environment.

Additionally, the UNIX vendors can take on Microsoft directly by producing a version of UNIX that will compete with Windows NT on the x86 architecture. Sun's new Solaris operating system is just such a venture: it is now available for x86-based architectures as well as for Sun's SPARC machines.

Neither of these strategies is entirely safe either. UNIX's connectivity is excellent, but heterogenous networks (with multiple computer architectures, multiple operating systems, and multiple network protocols) are potentially difficult to administer, and it is not at all clear what level of complexity the enterprise computing market will tolerate.

Most UNIX vendors are hardware companies. They bundle UNIX with their hardware, and they adapt the operating system to show off their hardware to its best advantage.

The software solution is also fraught with peril. The UNIX vendors in general are not practiced at providing software for computers they did not build. (To Sun's credit, Solaris for x86 is a cooperative venture with Interactive Systems, the first company to produce a commercially viable port of UNIX to the Intel-based personal computer environment.)

To address the issues of enterprise computing, the software must be more than good: it must also support the standardization that the business market seems to crave. Sun can ensure consistency and source code compatibility across the platforms (SPARC and x86) on which Solaris runs, but there is also a larger issue of the UNIX community's ability to unite behind standards convincingly.

NEW AND IMPROVED?

Finally, what does the struggle to succeed in the enterprise computing market have to do with novelty? Microsoft has laid claim to the "N" word for its product, and at the product's core, there is, in fact, something new: microkernel architecture.

In a microkernel-based operating system, system services are distributed across relatively small modules. The kernel that actually interacts with the hardware remains small, and operating system services can be layered to use memory more efficiently. In addition, the modularity of this architecture produces a system that can be extended with relative ease. (Carnegie Mellon University also employed the microkernel design in its Mach operating system.)

How does this technology solve the problems of enterprise computing? By itself, it doesn't. The novel technology is nestled deeply in an operating system loaded with features. The features themselves are undoubtedly much in demand, but they are hardly revolutionary. In the short term, the features will probably carry more weight than the creative technology at the product's core.

In the very short term, the reception of NT in the business world depends on how well it is recognized as something that addresses the problems of the whole business enterprise. Ironically, the promotion of NT as a connectable, scalable, portable, secure operating system is an appeal to the same qualities that have made UNIX so durable. ■

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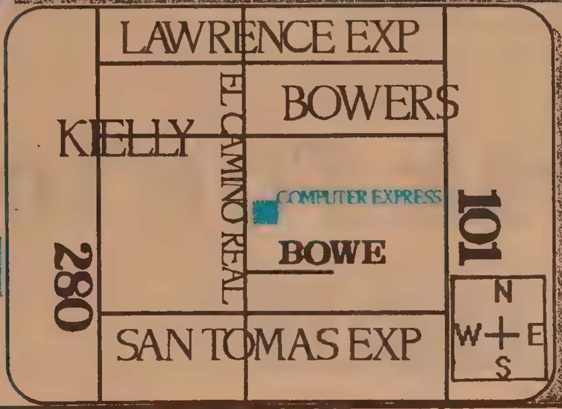

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A Tax Break For Your Software R&D

Software Developers Benefit From Proposed IRS Regulations

BY DAVID SIMON, CPA and JENNIFER R. CHERNISS

RESOURCES:

"Research and Experimental Expenditures," Proposed Treasury Regulation Section 1.174-2 (3/24/93), Fed. Reg. Vol. 58, No. 55, p. 15819

"The Tax Concept of Research or Experimentation," *45 Tax Lawyer 85* (Fall, 1991)

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New proposed regulations issued by the IRS on March 23 should be a boon to software developers, removing major barriers that have restricted the eligibility of research and development tax breaks.

The new rules also benefit a broad spectrum of taxpayers involved in research and development or in-house computer programming. Superficially, the changes are merely proposed guidance for interpreting the term "research and development expenditures." Implicitly, however, they supersede a mass of restrictions that have deprived software developers and others of valuable tax planning opportunities.

Many software developers who had only dreamed of qualifying for the tax benefits associated with research and development will suddenly make the grade.

The Treasury Department has apparently been groping for decades to define R&D in a way that satisfies Congress's desire to extend tax breaks to those qualifying for them, yet limits the number of hooks that can fit through the loophole. In recent years, regulations have focused primarily on the nature of the product being produced. Restrictions were placed on how the product could be used, and the regulations were supported by a plethora of examples illustrating software development costs that failed to qualify.

Because of these interpretations, much of the cost associated with software development has been excluded from Congress's largess. Even in cases where software development costs were finally determined to qualify, interpretation of the rules was often controversial, resulting in costly wrangling in the courts. I would venture that the IRS may be backing down with this "clarification" partly because it must have spent a lot of time explaining and justifying its prior position.

Perhaps Clinton Administration efforts to bond with high-tech industry leaders has improved the IRS's attitude, or perhaps the ol' slowly turning wheel has just finally come around, but the result of this rare bout of genuine tax simplification effectively reverts the regulatory stance toward software development costs to that taken by the IRS in 1969, when it was relatively easy to meet the qualifying tests.

Many software developers who had only dreamed of qualifying for the tax benefits associated with research and development will suddenly make the grade. In some cases, in which only a small amount of the expenditures previously qualified, existing tax benefits will be expanded.

WHICH SOFTWARE R&D EXPENSES QUALIFY

Determining what qualifies as R&D expenditure as defined by the IRS is important for many reasons. Only qualifying expenditures are eligible for particularly favorable accounting treatment resulting in rapid tax write-offs. Also, as explained later in this article, expenditures not qualifying are ineligible for the credit for increasing research activities.

The proposed regulations require that, to be qualifying R&D expenditures, the investments in question must be used to discover information that would eliminate uncertainty about the development or improvement of a product such as software. Essentially, all of the following must be true:

1. The product is being developed or improved.
2. There is uncertainty as to if the product can be developed or improved, or if the method of doing so will work.
3. The expenditure is intended to discover information that would eliminate this uncertainty.

These criteria can be relatively easy to meet where software is concerned, especially compared to the earlier IRS interpretations.

Of major significance to software developers, the new rules remove the "timeline" approach, under which development costs no longer qualified as R&D once the software or product met its basic design specifications.

To illustrate, imagine that Multinothing, Inc., produces and markets Wordless 2.0. Based upon hand-written requests from customers, the company felt it was in their interest to do some minor debugging and distribute an update, Wordless 2.1, to all their customers who had offered comments and complaints.

Under the old guidelines, the costs incurred in producing the update would not have qualified, since the changes

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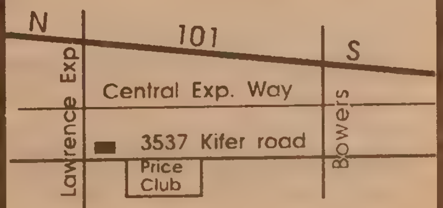

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made to the existing software did not modify the basic design specifications relating to performance levels and functions of the software. The new rules, however, lift this restriction.

Another important restriction now eliminated is the "significant improvement" requirement. Under the old guidelines, once the software or product met its basic design specifications, only the costs of curing significant defects in design, obtaining significant cost reductions, or achieving a significantly enhanced function or performance level would qualify.

Thus, improvements to software had to reach the status of being "significant" in order to qualify as R&D expenses. There is no such "significant" standard under the new rules.

Let's say that back when Multinothing was developing program modifications on their original 1.0 package in anticipation of releasing a completely new, 2.0 version, they believed that 2.0 would achieve a "significantly enhanced function or performance level" because it could reproduce the user's thoughts onscreen without the use of a keyboard for input. The IRS examining agent auditing them at the time, not knowing a Mac from a mouse, didn't see what the big deal was and disallowed the treatment.

> **Of major significance to software developers, the new rules remove the "time-line" approach, under which development costs no longer qualified as R&D once the software or product met its basic design specifications.**

You can imagine how much litigation and controversy between taxpayers and the IRS ensued over this requirement. Part of the reason why the IRS withdrew from this requirement was the difficulty they had encountered in maintaining a consistently defendable interpretation of their terms.

Another important restriction that disappears under the new proposed regulations is an exclusion for "the adaption of an existing capability to a particular requirement or customer's need." The old guidelines used an example of a software developer producing an inventory control system. The developer customized the software with modifications to meet one customer's particular warehouse and distribution needs. Since the changes to the software did not alter the basic design specifications, the developer's expenditures in making the changes did not qualify as research or experimental expenditures.

The new rules carry no such restriction.

SOME EXCLUSIONS DROPPED

The listing below summarizes some of the specific exclusions from the definition of R&D which are dropped in the new proposed regulations.

- The "time-line" concept—expenditures would not qualify if incurred after the point that the product meets its basic design specifications related to function and performance level, unless modifications were for the purpose of curing significant defects in design, obtaining significant cost reductions, or achieving significantly enhanced function or performance level.
- Internal use product—expenditures related to management functions or techniques developed primarily for the taxpayer's own in-house use.
- Nonfunctional aspects—expenditures directed at the nonfunctional aspects, including expenditures relating to style, taste, cosmetic, or seasonal design factors.
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See next section for Token Ring Pocket Adapters.

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Linkbuilder TR 3C510182	3,107
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PROTEON DNX 300i Token Ring to Token Ring	4,162
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PROTEON DNX 300i Token Ring to Dual Series	4,919
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Noderunner Starter Kit 5.0 for DOS	477
Noderunner Starter Kit for Windows	550
Noderunner/C Coax 16-Bit Adapter	188
Noderunner/A Combo 16-Bit Adapter	238
PeerHub	289
Lantastic 5.0 for NetWare	296
Lantastic for Mac	578
Lantastic A/I for Windows/6 user/12 user	139/462/847
Lantastic 5.0 for TCP/IP	177
Etherbasket AE-2 Adapters (12 pack)	2,172
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MICROSOFT Windows for Workgroup	
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•Customization costs—expenditures that are for the adaption of an existing capability to meet a particular use or to customize it for a particular customer's situation.

An important cautionary note is in order here: simply because a software expenditure is no longer disqualified from R&D treatment under one of the old examples doesn't mean it necessarily qualifies now. There may be additional considerations.

DEFINING R&D

Just so the IRS doesn't let things get too easily understood, what qualifies as a research and development activity depends upon the tax treatment for which it is being claimed. One set of rules governs the definition of R&D for tax accounting rules. These rules have been interpreted specifically for computerized software expenditures. Additional rules apply in determining if the expenditure qualifies for a tax credit for increasing research activities.

An article analyzing the tax treatment of software development costs, written by the attorney-advisor, office of chief counsel of the IRS, presents the definitions of R&D in far greater detail. If you have access to a law library, see Hudson, "The Tax Concept of Research or Experimentation," *45 Tax Lawyer 85* (Fall, 1991), or call my office for a complimentary reprint, pending permission of the publisher.

THE IMPORTANCE OF QUALIFYING

Under special tax accounting rules, expenditures meeting the definition of R&D can be expensed (written off for tax purposes) in the year that the costs are incurred.

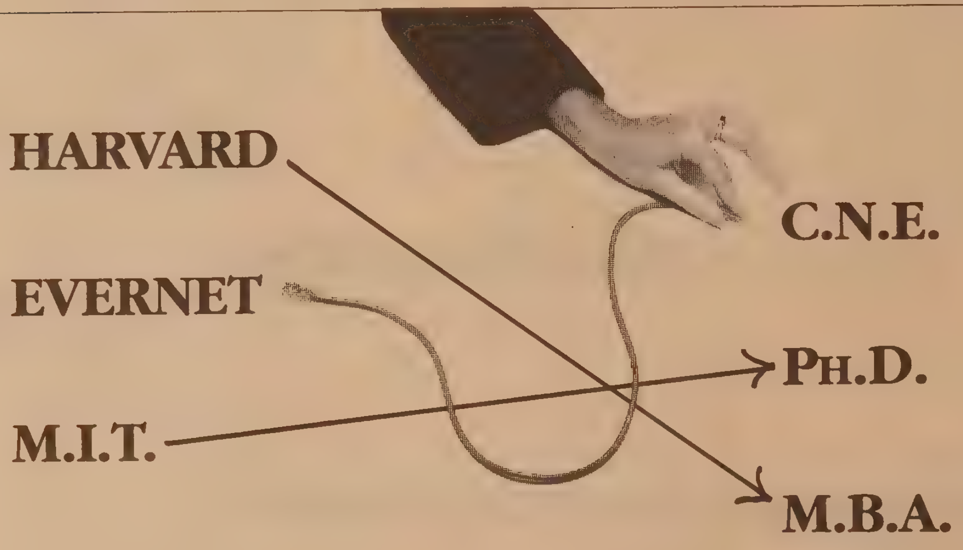
For an example of how the tax accounting rules apply to start-up costs, Nancy Finny and Victor Garcia are involved in a start-up business and hope to bring a new software product to market within three years. They know it's a costly undertaking, so both have kept their day jobs, and would like to shelter this taxable income.

In the first year, they spend $50,000 in connection with writing software. Their expenses consist of rent, salaries, insurance, telephone, and office expenses, but they didn't buy any machinery or equipment. As the IRS sees it, Finny and Garcia aren't considered to be engaged in a trade or business until their new software is ready and available to customers. Therefore, they normally wouldn't be permitted to claim any business expense deductions until their shrink-wrapped packages are ready to ship. Only then can they begin to depreciate or amortize the costs, a slow process of spreading the tax deductions over a period of many years.

However, if the software development costs qualify as R&D expenditures, they may be able to deduct the costs from their income taxes during the start-up period before the product is ready for sale. And if they can't take full advantage of the tax benefits during the start-up period, they can make an election to amortize the costs over a period of not less than five years, meaning that the costs are ratably deducted.

Another case illustrates how the tax accounting rules apply to inventory capi-

continued on page 124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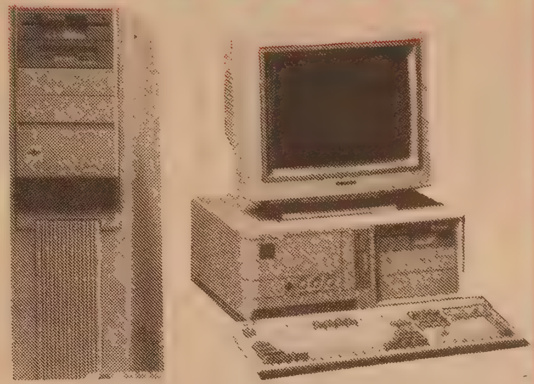
486DX-50 VLB w/128K	$516	$676	$881	$1101	$1154	$1196
486DX-33 VLB w/128K	$372	$532	$737	$957	$1010	$1052
486DX2-66 EISA/VLB W/256K	$692	$852	$1057	$1277	$1330	$1372
486-50 EISA/VLB W/256K	628	788	993	1213	1266	1308
486-33 EISA/VLB W/256K	478	638	843	1063	1116	1158
486DX2-66 ISA W/128K	568	728	933	1153	1206	1248
486-50 ISA W/128K	498	658	863	1083	1136	1178
486SLC2-50 IBM MB W/64K	328	488	693	913	966	1008
486-33 ISA W/128K	352	512	717	937	990	1032
486SX-25 W/128K	158	318	523	743	796	838
386-40 W/128K	126	286	491	711	764	806
386SX-33	77	237	442	662	715	757
286-20	56	216	421	641	694	736



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ORCHID P9000 VLB w/3MB	308
ORCHID Fahrenheit VLB w/1MB	148
ORCHID Fahrenheit 1280 Plus w/1MB	143
TSENG Lab VGA w/1MB	73
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Cirrus Logic VLB w/1MB	92
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NEC 5FGE 17" 1024x768 .28	1088
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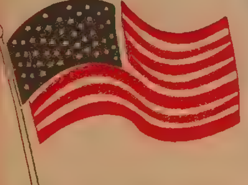

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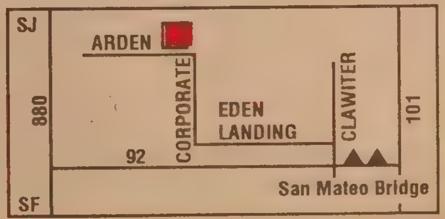

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DX33	$1382	$1402	$1432	$1468	$1573
DX2/66	$1642	$1662	$1692	$1728	$1833

- Elitegroup 486 motherboard
- Integrated 8Kb cache, upgradable to 256Kb
- 4Mb, 70ns high-speed memory, expandable to 32Mb
- 6 ISA slots
- 3.5-in. floppy drive
- 1024 x 768 SuperVGA adapter, with 1Mb RAM
- 1 parallel, 2 serial, 1 game port
- Enhanced 101-key mechanical keyboard
- 14-in. SuperVGA color monitor, 1024 x 768
- Ergonomic desktop chassis with 200W power supply

Option:

- Upgrade to Prestige Slimline molded chassis with 85W power supply [$20]

SHASTA 486 $1222 PRESTIGE DESKTOP SYSTEM

Intel486	130Mb	170Mb	214Mb	250Mb	340Mb
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SX33	$1318	$1338	$1368	$1404	$1509
DX33	$1443	$1463	$1493	$1529	$1634
DX2/66	$1703	$1723	$1753	$1789	$1894

- Elitegroup VESA Local Bus 486 motherboard
- Pentium™-technology ready, 238-pin ZIF socket
- 128Kb cache, upgradable to 256Kb
- 4Mb, 70ns high-speed memory, expandable to 32Mb
- 6 ISA slots
- 2 VESA Local Bus slots: 1 master, 1 slave
- 3.5-in. floppy drive
- 1024 x 768 SuperVGA adapter, with 1Mb RAM
- 1 parallel, 2 serial, 1 game port
- Enhanced 101-key mechanical keyboard
- 14-in. SuperVGA color monitor, 1024 x 768
- Prestigious molded chassis with 200W power supply

Options:

- Upgrade SuperVGA adapter to 1Mb VL adapter [$50]
- Upgrade to mid-tower chassis [$14]

SHASTA 486 $1651 EISA MID-TOWER SYSTEM

Intel486	214Mb	250Mb	340Mb
DX33	$1651	$1687	$1792
DX2/66	$1911	$1947	$2052

- Elitegroup EISA/VESA Local Bus 486 motherboard
- Pentium-technology ready, 238-pin ZIF socket
- 128Kb cache
- 4Mb, 70ns high-speed memory, expandable to 128Mb
- 8 EISA slots
- 2 VESA Local Bus slots: 1 master, 1 slave
- 3.5-in. floppy drive
- 1024 x 768 SuperVGA adapter, with 1Mb RAM
- 1 parallel, 2 serial, 1 game port
- Enhanced 101-key mechanical keyboard
- 14-in. SuperVGA color monitor, 1024 x 768
- Ergonomic mid-tower chassis with 200W power supply

Option:

- Upgrade SuperVGA adapter to 1Mb VL adapter [$50]

SHASTA 486 $1722 MULTIMEDIA SYSTEM

Intel486	130Mb	170Mb	214Mb	250Mb
SX25	$1722	$1742	$1772	$1808
SX33	$1818	$1838	$1868	$1909
DX33	$1943	$1963	$1993	$2029
DX2/66	$2203	$2223	$2253	$2289

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- Front panel controls:
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  - Volume control
- Elitegroup 486 motherboard
- Integrated 8Kb cache
- 4Mb, 70ns high-speed memory, expandable to 32Mb
- 6 ISA slots
- High-performance multimedia audio adapter
- CD-ROM drive with an abundance of CD titles bundled
- 3.5-in. floppy drive
- 1024 x 768 SuperVGA adapter, with 1Mb RAM
- 1 parallel, 2 serial, 1 game port
- Enhanced 101-key mechanical keyboard
- 14-in. SuperVGA color monitor, 1024 x 768
- Integrated MPC chassis with 200W power supply

Mid-Tower System
Multimedia System

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486DX2-66C VLB	549	709	909	1,009	1,049	1,099	1,129	1,269	1,309	1,349	1,379
486DX-50C VLB	489	649	849	949	989	1,039	1,069	1,209	1,249	1,289	1,319
486DX-33C VLB	349	509	709	809	849	899	929	1,069	1,109	1,149	1,179
486DLC-40C VLB 87DLC-40 Inc'd	259	419	619	719	759	809	839	979	1,019	1,059	1,089
486DLC-33C VLB 87DLC-33 Inc'd	199	359	559	659	699	749	779	919	959	999	1,029
486DX2-66C EISA	619	779	979	1,079	1,119	1,169	1,199	1,339	1,379	1,419	1,449
486DX-50C EISA	549	709	909	1,009	1,049	1,099	1,129	1,269	1,309	1,349	1,379
486DX-33C EISA	409	569	769	869	919	969	999	1,139	1,179	1,219	1,249
486DX2-66C ISA	529	689	889	989	1,029	1,079	1,109	1,249	1,289	1,329	1,359
486DX-50C ISA	479	639	839	939	979	1,029	1,059	1,199	1,239	1,279	1,309
486DX2-50C ISA	429	589	789	889	929	979	1,009	1,149	1,189	1,229	1,259
486DX-33C ISA	319	479	679	779	819	869	899	1,039	1,079	1,119	1,149
486SX-33C ISA	199	359	559	659	699	749	779	919	959	999	1,029
486SX-25C ISA	129	289	489	589	629	679	709	849	889	929	959
486DLC-40C ISA 87DLC-40 Inc'd	219	379	579	679	719	769	799	939	979	1,019	1,049
486DLC-33C ISA 87DLC-33 Inc'd	189	349	549	649	689	739	769	909	949	969	999
486SLC-33C ISA	149	309	509	609	649	699	729	869	909	949	979
486SLC-25C ISA	139	299	499	599	639	689	719	859	899	939	969
386DX-40/64C ISA	119	279	479	579	619	669	699	839	879	919	949
386SX-40C ISA	79	259	459	559	599	649	679	819	859	899	929
386SX-33 ISA	69	239	439	539	579	629	659	799	839	879	909
386SX-25 ISA	59	229	429	529	569	619	649	789	829	869	899

BASIC SYSTEM: M/B & CPU, 1MB(512K for 386SX/486SLC) Memory, IDE Controller, 1.44MB FD, Enhance Case with Power Supply and Keyboard.

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IDE 2HD/2FD Cache(0K) ISA .3MS	99
IDE 2HD/2FD 2S1P1G	19
MFM 2HD/2FD	35

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Adaptec 1522B SCSI w/Driver(ISA)	59
Ultrastor 14F SCSI2 Bus Master(ISA)	299
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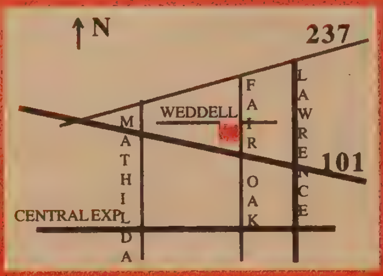

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Moving To Windows In A Large Business

A Successful And Smooth Conversion To Windows Requires Planning, Salesmanship, And Training.

BY MITCH GORDON

You've heard the promotion and the praise and are beginning to believe that Windows is where PC software technology is headed. But when it comes to actually converting your company to Windows, a company that depends on a collection of old XT's and AT's running DOS programs for its daily business, that conversion looks pretty intimidating. It's expensive, it's people-intensive, and it can cause infighting and resistance within the organization.

Ultimately, though, the conversion to Windows is something that every company that relies on DOS programs should do. The PC software industry is definitely moving that way. Windows is no utopian world, but it should not be underestimated either. Windows is substantially better than DOS as an operating environment—the difference is something like the difference between the Macintosh and the old Apple IIc. With Windows you can work in multiple software packages at the same time (your budget spreadsheet in one window, the cover letter in another), you can add a new printer to all of your existing packages at once with no individual idiosyncrasies. Everything is so much nicer to look at and easier to learn to use. What you see on the screen really is what you get (try that in your DOS word processor!). The "Help" facility in Windows-based programs gives you a true online reference system, not the token help of DOS programs.

> **People who are learning to use computers for the first time are the most enthusiastic, and seem baffled as to what is holding back the faithful DOS users.**

User satisfaction after an upgrade to Windows tends to be initially mixed, but overall positive. At the facility I was responsible for converting last year, I counted only a handful of users who clung stubbornly to one or another of their pre-Windows DOS programs, especially spreadsheets, as opposed to twenty or thirty who moved to and become quite happy with the Windows-based applications. People who are learning to use computers for the first time are the most enthusiastic, and seem baffled as to what is holding back the faithful DOS users. Salesmanship and comprehensive training are the keys to winning over the old guard.

THE COSTS OF CONVERSION

Aside from the resistance of users who are reluctant to change ("I don't like the mouse"), the major difficulty for a company in converting is the expense. The true cost of conversion needs to be realistically assessed before a company commits to it. You had better plan on replacing every XT or AT with a 386 or 486. Expect to upgrade every computer's video to VGA color, memory to 4MB and disk storage to 80MB on every 386, 386sx, or 486. Everyone will need a mouse (the $60-$80 kind, not the $30 kind). Expect to replace all of your dot-matrix printers with inkjet printers (or with shared access to laser printers). Also, plan on replacing all of your basic office automation software (word processing, spreadsheet, and business graphics), and buying Windows 3.1 (or Windows For Workgroups) and DOS 5 or 6 for every machine as well.

To really understand what your organization is getting into, you should take the time to set up a spreadsheet for calculating the conversion costs. You need to identify how many new computers or motherboard upgrades are needed, how many copies of each software package, how many hard drive upgrades, and how many printers. Keep current prices for each of these items in one section of the spreadsheet, required quantities for each item in another section, and the resulting extended costs in a third section. This makes it easy to make changes as prices or requirements change. After you arrive at a bottom line, you may have to take some deep breaths and sit down.

Yes, it's a lot of money. If it's any comfort, try to remember that all of the hardware expenses are ones that your company would need to make eventually, especially if you are going to install a LAN. None of this hardware is specialized for Windows—it is all simply more current technology. There are benefits to upgrading your hardware, with or without migrating to Windows. Large VGA monitors are easier to read than monochrome or older color technologies, 386/486's are much faster than XT's or AT's, and so on. But to realize the potential of the newer hardware technologies for making work easier, you need the newer software technologies as well, and that means Windows.

Once you have your conversion costs spreadsheet, you can start playing with the figures to explore ways of bringing the costs down, or spreading them out over a longer period. Beware of thinking that your company can squeak by on less powerful hard-

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Mitch Gordon is a Bay Area-based freelance technical writer and PC consultant, specializing in Windows. He can be reached on CompuServe at 71702,136.

ware than I have outlined. It won't work right, and the conversion effort may sabotage some of its own credibility.

Instead, focus on the software side of the cost equation. Certainly each PC will need DOS and Windows as well as a Windows-based spreadsheet package and word processing package. But you shouldn't put more software than that on each PC unless you know that a user needs it. This applies to business graphics, database, painting and drawing, and other software. Hold off on file management utilities, "Windows improvers," daily planners, communications software and the like—Windows comes with all of the accessories and utilities the typical user needs, and it all works pretty well.

Of course, you can reduce software costs in several foolish ways. You can: 1) steal it (buy one copy, get fifty free—it's a felony these days); 2) try using your old non-Windows software with Windows (this defeats the whole point of Windows); or 3) convert some of your users and not others (this creates jealousy and infighting).

> **To realize the potential of the newer hardware technologies for making work easier, you need the newer software technologies as well, and that means Windows.**

Here are some more sensible software cost-cutting approaches:

- **Upgrade Existing Licenses:** If your company's DOS software is already fully licensed you can replace it with Windows versions of the same products for about one-third to one-half the list price of the new software. This is by far the cheapest way to buy software. For example, a copy of WordPerfect for Windows is under $100 if it is replacing a licensed copy of WordPerfect for DOS, as opposed to the $250 retail (nonupgrade) price. If you plan to change vendors (for example, replace WordPerfect for DOS with Microsoft Word for Windows), you may be able to find "competitive upgrade" prices that are comparable to the price of upgrading within your current vendor's line. Be sure to verify that the competitive upgrade from your existing product to the one you want is still available, as these deals come and go. The single-vendor (noncompetitive) upgrade deals are more predictable.
- **Buy Bundled Office Automation Packages:** If your organization hasn't been legally licensed in the past and wishes to become legal now, several money-saving options are available, one of which is buying one of the two "bundled" office automation packages: Microsoft Office and Lotus Smart Suite. Microsoft Office contains Word, Excel and PowerPoint (a business graphics package) at about half the cost of the same applications bought separately (at $450 for the bundle vs. $900 for the three packages bought individually). Lotus Smart Suite is a similarly priced bundle of Lotus, Ami Pro and Freelance. If your organization has a lot of business graphics users, the bundled packages are quite a bargain. If business graphics users are scarce, you still realize some savings but more on the order of 20% instead of 50% (Word plus Excel is about 20% more expensive than Office). The only thing you give up by buying bundled packages is the ability to mix products from different vendors.
- **Buy Low-Cost All-In-One Packages:** At about $150 for integrated word processing, spreadsheet, business graphics and a simple database, the "works" packages (like WordPerfect Works and Microsoft Works) are very inexpensive. These are really only appropriate for entry-level users, though—don't try to force one on an intensive user. You can mix low-end ("works") and high-end (bundle) packages within the same organization if you stay with a single vendor. You would stay single-vendor for easy interconversion of documents.
- **Use Your LAN As An Excuse To Buy Fewer Copies:** Here's a neat money-saving tip if your users are all on a Local Area Network (LAN). Apparently you are only legally responsible for having as many licensed copies of software on a LAN as there could possibly be users using that software at the same time. You may have thirty PC's on the LAN, but maybe only fifteen of these people will ever access Word at the same time, so you only buy fifteen copies. I leave it up to you to figure out how to prove how many copies are used by how many people. The application software packages must reside on the LAN, not on individual PC's, and every PC will need its own copy of DOS and of Windows.
- **Quantity Discounts:** It's unfortunate, but don't expect to save more than 10–15% by buying in quantity. Shop around, though.

SELECTING WINDOWS SOFTWARE AND GETTING USER "BUY-IN"

The key to selecting software is trying it out. This assumes you have gotten preliminary approval to proceed (after showing rough cost figures to upper management) and can get one or two thousand dollars of company money together to buy software to evaluate. Trade shows and computer dealers let you try software too, but you and the rest of your organization won't get a clear picture of what you're buying that way. You wouldn't buy a car based entirely on a salesperson's recommendation or seeing it at an auto show. I suggest buying a copy each of Office, Smart Suite, and WordPerfect; optionally you might also want to try Microsoft Works, Harvard Graphics, and Quattro Pro.

Use each package for your own work at the computer for a month or so, in place of your accustomed software (yes, I realize it's hard to part with your old faithful). Normally a group of people will be involved in the evaluation process. I suspect it is illegal to make temporary software copies for evaluation purposes; a safer alternative might be to rotate the licensed copies within your evaluation group (for example, I'll have Lotus this month while Sam uses Excel and Julie has Quattro).

Because all of your organization's PC software is being replaced, the evaluation and selection process will prove to be much more political than technical, and is the touchiest phase of converting to Windows. Successfully navigating through this difficult period requires balancing the needs of the user community and the needs of the computer support people. Success depends on fairness, and active solicitation of the views of everyone who will be affected.

Computer support and computer users are rivals in a feud that possibly predates the Hatfields and McCoys. In organizations with well-managed computer support departments the mistrust is minimized, but I've never known it to go away. What is important to remember is that both sides have a valid interest in how the selection

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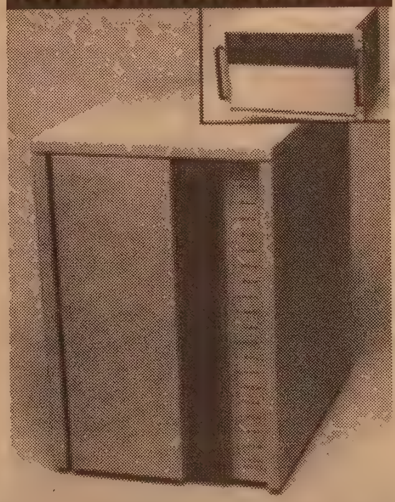

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process turns out. Computer support needs to assure that everything works well with everything else (whether it's a LAN, a mainframe, existing software or existing data that they're trying to preserve intact). They probably have a tight budget to control, and are justifiably suspicious of self-proclaimed computer experts in the user community who are pushing their own pet products.

On the other side, the user community must actually use the software, as well as convert their skills from what they now use. Users will be very interested in training. They cannot be expected to give up any capabilities of their current software that they depend on. They should be listened to, not dictated to, although clearly not everyone will get everything they want.

Two valuable tools in managing the selection process and getting "buy-in" are the "windows implementation committee" and the "town meeting." The implementation committee will normally consist of middle management representing all departments, and needs to include computer support as well. If a computer support department doesn't exist locally, a computer consultant with relevant experience really should be brought in to provide a technical perspective. The point of this committee is to devise an implementation plan for the conversion to Windows that satisfies the entire management of the organization. Issues such as training, conversion costs and software selection should be hammered out here.

The "town meetings" are a way of getting users, as opposed to just management, involved, both to influence the final decision with real-world input and to give the users a sense of having involvement in the conversion process. Different software options are presented, the Windows concept is explained and promoted (with the intention of easing the misgivings of the users), and straw-poll votes can be taken to give management feedback on what the users want or don't want. It should be made clear at these meetings that such votes are advisory in nature, and not actually making the final decisions. Town hall meetings can be small or large. In a corporation with multiple sites, management and user participation need to be solicited at each site.

One other potentially serious rift that can occur besides the computer-support-vs.-users one is that between "Windows evangelists" and "Windows skeptics." It can occur within computer support, management or the user community as well as between any of these groups. The Windows evangelists tend to be the people who started the ball rolling towards Windows in the first place. They are completely convinced of the need for Windows, are unconcerned about the costs and difficulties, are impatient with the critics, and are often overly enamored with everything from Microsoft.

The Windows skeptics will be unfamiliar with Windows and suspicious of the hype surrounding it. They will focus attention on the high cost and difficulty of adjustment

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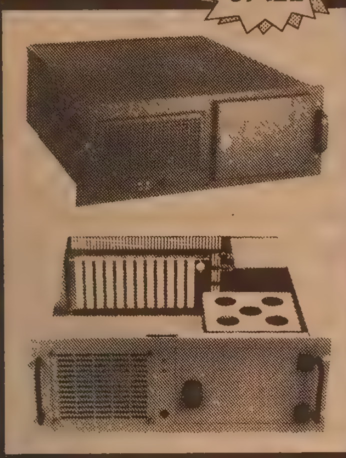

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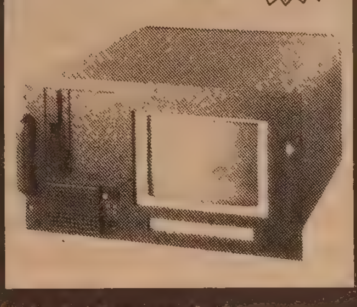

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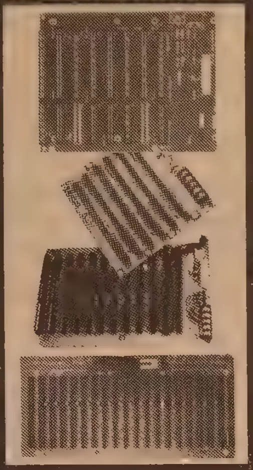

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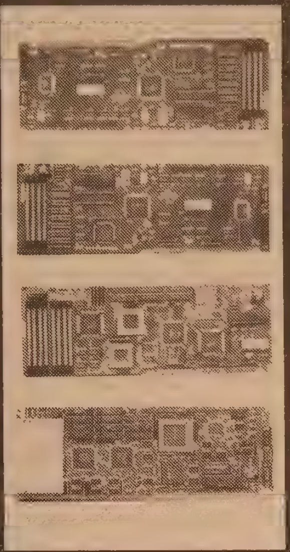

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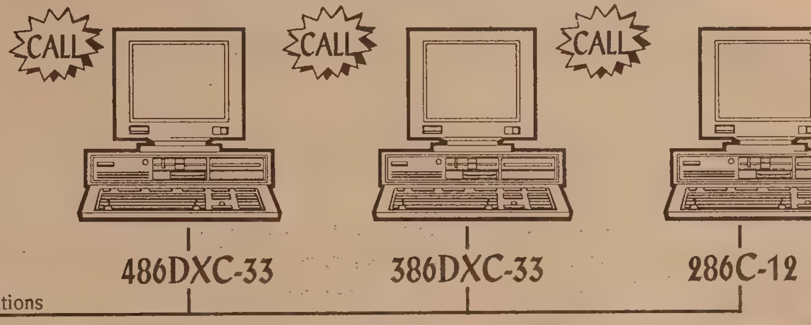

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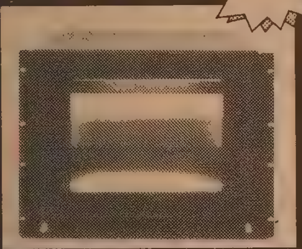

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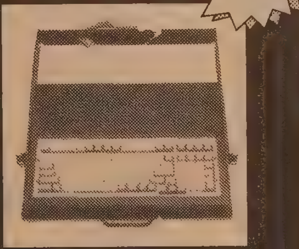

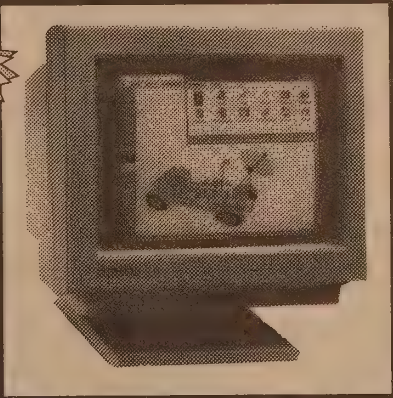

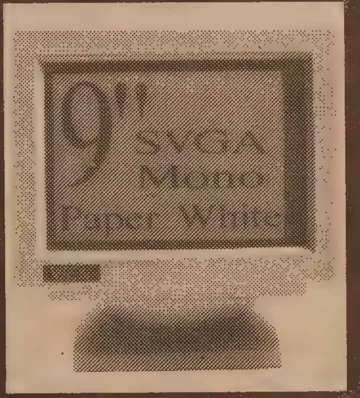

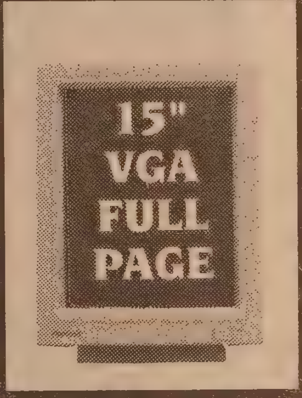

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they fear the users will experience. They will probably be more interested in the Windows-based products from their existing word processing and spreadsheet vendors than the Windows-based products of Microsoft, assuming that they can be made interested in Windows at all.

The keys to making it past the rocks are fairness and participation. Both sides—evangelist and skeptic—have valid points of view and useful contributions to make. The evangelist gives the process the drive to move forward; he or she sells the Windows concept to everyone in sight and is quick to identify all of the potential benefits. The skeptic provides the reality check—asking if your company can really afford this, pondering the difficulties and how to resolve them. Evangelist and skeptic are like accelerator and brake—you need both.

Two final points on software selection. If your organization has a large amount of in-house software written using a PC database product, you will have valid concerns regarding how to move your software and data into Windows painlessly and retrain your programmers. Without getting into detail, I strongly suggest that you go with dBASE for Windows, FoxPro for Windows or (if you currently use Paradox for DOS), Paradox for Windows. [dBASE hasn't been released yet but the beta test version I saw looked pretty good; FoxPro and Paradox are already available]. In this situation it is best to avoid the "visual programming" products like Visual Basic and ObjectVision, and likewise the new user-friendly low-end database products (such as Approach or FileMaker). The former are too difficult to use, the latter are not powerful enough or flexible enough for large application systems, and neither group is practical to convert to from dBASE, FoxPro or Clipper.

Although there are currently a variety of Windows out there—Windows 3.1, For Workgroups, NT, Modular versions for laptops and palmtops—for your purposes as an evaluator of software I suggest staying with 3.1 or Windows For Workgroups (which is about the same thing plus simple networking). The real difficulty is getting everybody in your organization from DOS to Windows; once they're all comfortable with Windows the changes from one version to another will be pretty trivial for them.

MAKING THE CONVERSION

Once buy-in from all parties has been successfully obtained, and once there is funding from upper management, the conversion gets easier and becomes a matter of logistics.

The new computers must be hooked up, the older ones upgraded, and the software needs to be installed. Contrary to what you might have heard in Apple's advertisements, installing Windows is quite simple and can be performed by almost anyone at your company—basically, all you do is run SETUP or INSTALL from the DOS prompt and feed in numbered disks. Similarly, the applications software that will run under Windows (Word, Lotus, etc.) is installed via a SETUP or INSTALL command from the Program Manager (the desktop), feeding disks in one at a time. Anytime you are offered a choice between FULL (or default)

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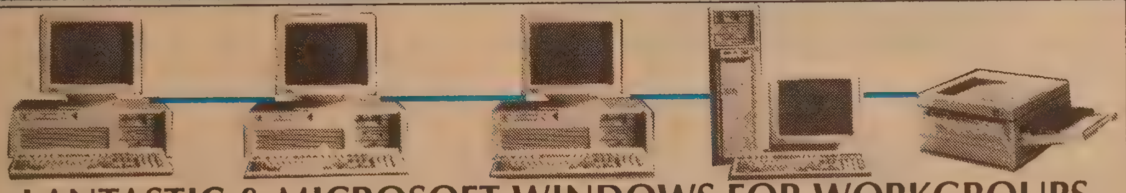

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As a computer support consultant performing Windows installation for a company, I like to make the Windows desktop look quite a bit different from the default desktop that gets created by SETUP. Then if the users want to make changes to the desktop layout I gave them, it is pretty simple for them to learn to do. I dislike the default program group windows (this will all mean more to you later!) of Main, Applications, and Accessories. I delete any technical note documents, I delete all icons for DOS-based applications and the MS-DOS prompt. I rename the Main group as Windows Setup. I divide up Accessories into Standard Accessories (desk accessories that people will use all of the time like the File Manager, the Calendar and the Calculator) and "Non-Standard Accessories" (all the stuff like "Recorder" and "PIF Editor" and "Object Packager" that should be stashed out of the way somewhere). Then I clean up the whole desktop visually, reshaping and arranging the important windows so they all come up on the desktop at the same time, and I minimize (reduce from a window to an icon) any window that will only be needed occasionally.

The point of the previous paragraph is not to intimidate potential new users—it is to alert the people doing the installing (if other than the users themselves) that you can clean things up a bit and make the desktop a lot friendlier and more usable place for the novice user. Again, if the terminology didn't make sense, reread it again sometime after you have actually installed Windows once and tried moving and grouping the desktop contents.

The most important aspects of the implementation phase are timing and training. Timing is important because you do not want too many users switching to Windows at once. Your computer support team will most likely be swamped. If a problem emerges, it's better for it to happen to five people rather than fifty. The idea is to plant the Windows concept and hardware and software and training in little sections like a new lawn and let them spread, rather than opting for aerial bombardment of grass seed.

High-quality professional training (or a good in-house imitation) will have many beneficial effects during the implementation. It will get the users off to a good start when they try to use the software. It will make them feel more included in the changes the company is making rather than having had change forced on them. It will create a nucleus of knowledgeable people who will cross-train other users.

The tendency in many organizations is to try to use the existing computer support staff to handle anything that has to do with user training. The problem with this approach is that user support people may be able to answer individual questions effectively as they come up, but usually aren't experienced in holding group classes that are hands-on and possibly all day long.

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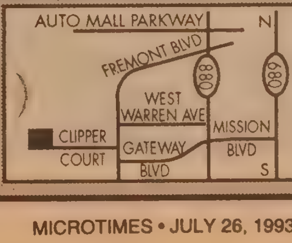

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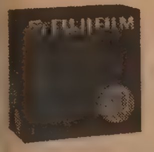

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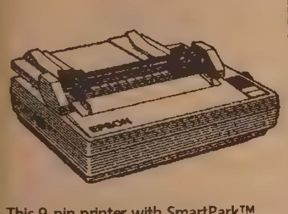

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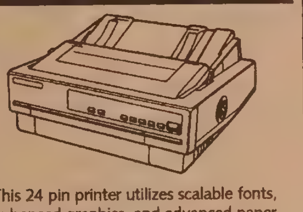

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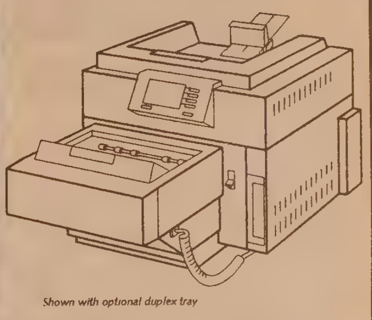

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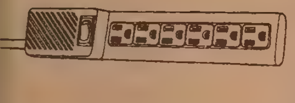

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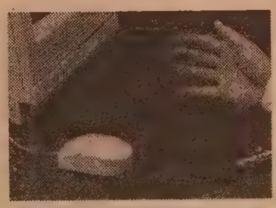

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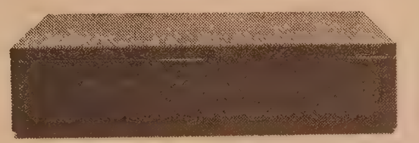

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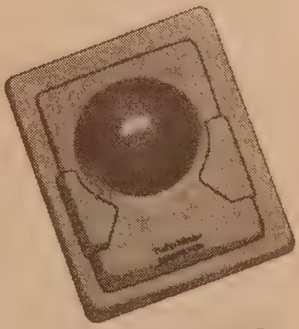
Turbo Mouse 4.0



The Turbo Mouse 4.0 Trackball is the latest generation of Turbo Mouse. Winner of more awards than any other Macintosh® input device. Among it's many features include a new, advanced software package which allows the user to customize cursor control, comfortably positioned and easy-to-press buttons, and two ADB ports for chaining other ADB devices. It is system 7.0 compatible and comes with a limited lifetime warranty from Kensington.

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about $200 per day per attendee. The usual Windows-related offerings are Basic Windows, Word, Excel, Lotus, WordPerfect, and some of the other common application packages. Classes are one day long, with beginning, intermediate, and advanced one-day classes for each software package.

If you decide to save money by providing classes in-house, try to use someone from computer support with prior computer-related teaching experience such as at an adult school or community college. Schedule classes so that students can absorb and try out material for a week or so before their next class. Restrict class sizes to around five or six people. Provide a computer to each person in the class.

Installation and training should be coordinated: users who are scheduled for the next batch of training classes should be the same ones who are scheduled for the next round of hardware and software upgrades. When a person receives training without also getting a Windows-capable computer on their desk, much of the benefit of training will be lost as well as any enthusiasm for Windows. Although you will perhaps be distressed early on to see users mostly experimenting with desktop colors and trying out the games, this turns out to be a sneaky and effective introduction to Windows for many of them.

LOOKING BACK IN RELIEF!

Once you and your coworkers or employees make it to the end of this process, you'll certainly be glad that it's over with. You will also start to notice all of the benefits of the new technology you are getting to work with. Users will discover nifty tricks and pass them around; many complicated and time-consuming ways of doing things that used to be necessary will get replaced with more straightforward methods. New software will become significantly easier to learn. Different software products will work well together.

Personally, I think Windows is great. Originally I was one of the skeptics, and it took actually getting it on my machine for a few months with some evaluation software to convince me that the evangelists were (on many points, at least) onto something. Now, I find it really annoying to have to go back to the old ways (a.k.a. DOS) even briefly, and have become something of a Windows evangelist myself.

Quite possibly you will have the same experience. ■

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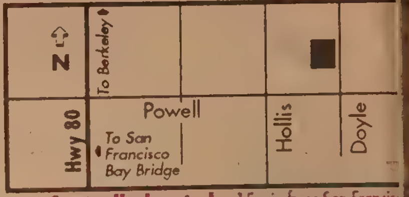

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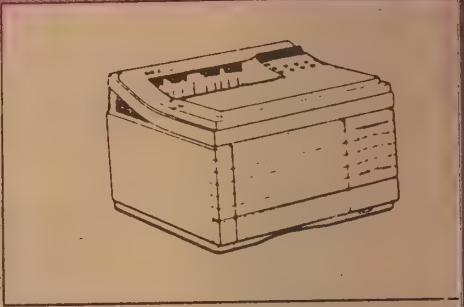

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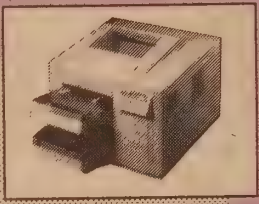

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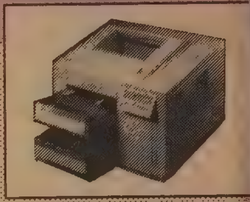

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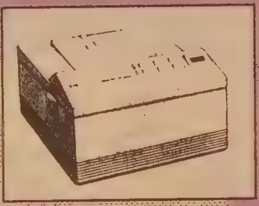

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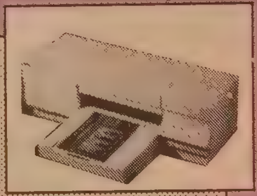

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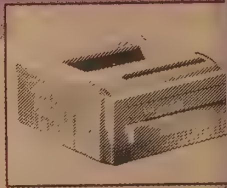

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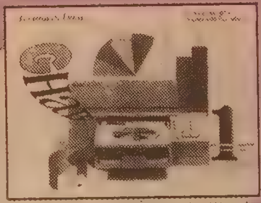

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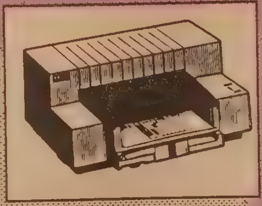

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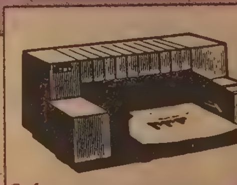

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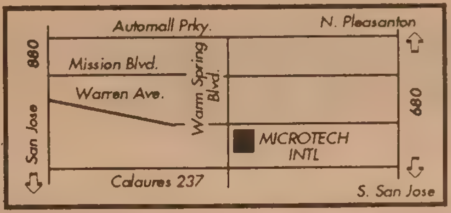

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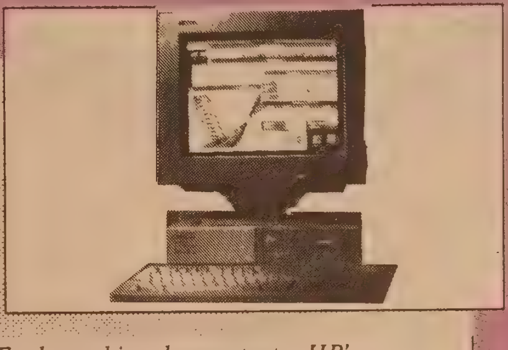

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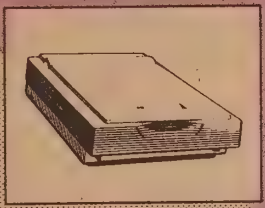

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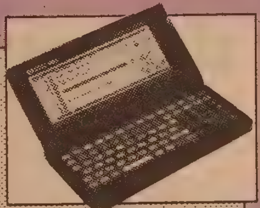

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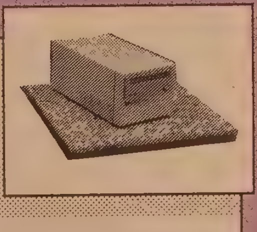

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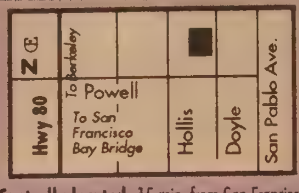

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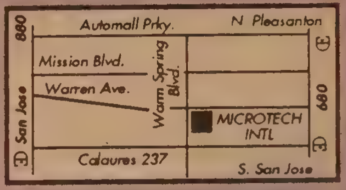

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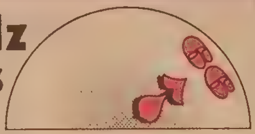

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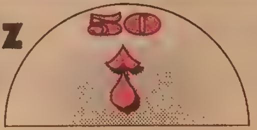

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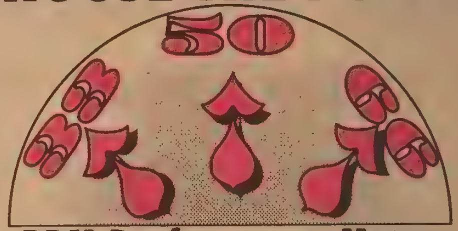

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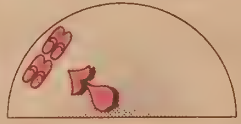

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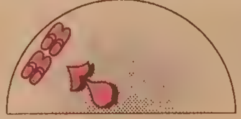

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Moving Beyond Contact Management

PC-Based Marketing And Sales Automation Systems Offer A Low-Cost Solution

BY RICHARD CLARKE

RESOURCES:

SOFTWARE:

ACTI 2.1 for DOS
Contact Software International, Inc.
1840 Hutton Dr., #200
Carrollton, TX 75006
(214)919-9500

Telemagic V12 for DOS
Remote Control, International
5928 Pascal Ct.
Carlsbad, CA 92008
(619)431-4000

Nurture 2.2B for DOS
Perceptive Solutions, Inc.
9492 Keating Dr.
Palm Beach Gardens, FL 33410
(407)626-4561

One of the newest areas of computer use in business is the greater use of contact management software in marketing and sales automation, or PC-based Marketing and Sales Automation (PC MSA). Contact Management software for PCs has been around for about ten years and was originally intended to improve a salesperson's productivity by replacing the manual customer and prospect notes, schedules, and routine correspondence, with a database-type program. Since then it has grown in capabilities to where the name Contact Management no longer fits. The most effective of the new generation of software goes far beyond the original salesperson's productivity tool. Now a company can use low-cost software to manage its sales force, both inside sales and external salespeople (on the road or in branch offices), and as an outbound marketing "engine" and advanced communication tool for customer-related information.

> ***Marketing and Sales Automation is among the most common automation projects in Fortune 500 companies.***

At its heart, PC MSA provides the necessary tools to accomplish four tasks:

- to improve the management of each customer contact
- for salespeople to manage themselves
- to better manage a company's sales force
- to improve the marketing of your company's products.

The companies that are skillful in these areas will prosper, even in these tough times.

With affordable desktop and portable PCs, networks, and available shrink-wrapped software, PC MSA is within the reach of most companies, even one-person offices. Marketing and Sales Automation improves the bottom line by increasing sales effectiveness (the number of customers one salesperson can handle), by improving the ability to support the customers you have, and to target new customers. For these reasons, MSA projects are now among the most common automation projects in Fortune 500 companies.

With PC MSA, smaller companies can be competitive with these larger companies. Often a small company can be even more effective at PC MSA, since change is easier in smaller companies, and the smaller company can react faster to their customers once the system is implemented. Unfortunately, though, smaller companies often are not able to take advantage of the power of PC MSA. At smaller companies, the person most interested in PC MSA is the company owner, president, or sales manager. But, since they are usually neither computer nor sales and marketing experts, they don't know what to look for in the software, how to set it up, or how to use it for best results.

Some of the issues to consider when planning the move to PC MSA are: What is possible, in the long and short term? What are other companies (perhaps even your competitors) doing? How do you get started? What does it cost? How do you choose the right software and hardware? How do you use PC MSA to measure the effectiveness of your advertising, PR, and sales campaigns?

Although there are technical issues surrounding PC MSA, the most important issues are the business ones. The value of PC MSA to your business comes from your ability to become more effective and efficient in dealing with your present customers, and in finding new ones.

This article will give an overview of what could happen to your company, what it might cost, how to take your first steps to get started, and some good software packages for you to look at.

WHAT PC MSA COULD MEAN TO YOUR COMPANY

Imagine...the phone rings. It is a call from a new prospect company. The purchasing manager of this company is calling to confirm their first order.

As you talk to him, you find out that he is impressed by your company's ability to listen to their needs and to respond to their needs. He also appreciates your ability to answer questions, and to handle his issues and concerns. That's a big part of why your company is getting the order today.

The purchasing manager said, "What impressed me is how well the field office and the main plant communicate, and how effective you are as a team."

This success was enhanced, in some way only possible because of your PC MSA system. First, you used information you'd collected about your best customers to specify and buy a list of prospects. You used a mailing to each prospect followed by a phone call from your inside sales group. Coordinating each of these steps was done via PC MSA.

When inside sales qualified the prospect and sent the information asked for, they also sent detailed information to the correct sales representative about the

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Richard Clarke, a marketing specialist, is presently a consultant specializing in PC-based Marketing and Sales Automation at The OMT Group in Santa Clara. He can be reached at (408)266-6109.

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prospect, their actions, and the prospect's specific interests and buying issues.

As your local sales rep found out more about the prospect's needs, this information was passed easily and automatically to the main plant. Every issue was responded to promptly, and the final proposal presented to the purchasing manager was perfect—just what he needed. So naturally, you got the order.

This is starting to happen all over the country today as companies invest in PC MSA and reap the benefits of learning to use their investment. PC MSA is more that just "sales automation." It can be a new form of communication and management that focuses on what the customer needs and delivers it promptly.

WHAT ARE THE COSTS?

The hardware and software costs are basically those of a PC, the network connection (including a file server), and commercially available software. You'll also want a laser printer (if you don't already have one). The other costs are for training, and, if you decide, a consultant for set-up and technical support.

Basic computer and network equipment will be four workstations (386-33MHz systems with 80MB disk drives and VGA monitors), network hardware (five network cards and one Ethernet hub), a file server (a 486DX-33MHz system with 4MB RAM, 210MB disk drive, and VGA monitor), a laser printer, Novell NetWare, DOS, and Windows.

Contact Management software varies greatly in both price and capabilities. The five packages discussed below are:

- ACT! 2.1 (DOS), (5 users, $1295)
- Goldmine, (5 users, $895)
- Maximizer, (5 users, $845)
- Nurture, (Unlimited users, $1795)
- Telemagic (4–10 users, $1995)

Consulting support can cost anywhere from $2000 to $5000 for outside support and training. However, this could be even more costly in a complex installation requiring much software tailoring.

Grand total to install PC MSA from the ground up, $10,890 to $15,045, or about $2800–$3800 per seat. If you already have a network in place, then the costs will be much lower, from $700–$1800 per seat.

CONSULTANTS

To increase the speed with which you see the results, and to decrease your risk of implementing a system that is not successful you should seriously consider hiring a consultant. Choosing the wrong system can easily be more costly than preparing properly for success. Consultants can help you understand the specific needs of your business, and opportunities you have for increased effectiveness. They can help you choose

With PC MSA, smaller companies can be competitive with these larger companies.

continued on page 126

RESOURCES:

Maximizer for Windows 1.1
Richmond Technologies
Ste. 420
6400 Robert St.
Burnaby, BC Canada
V5G 4C9
(605)299-2121

Goldmine 2.5
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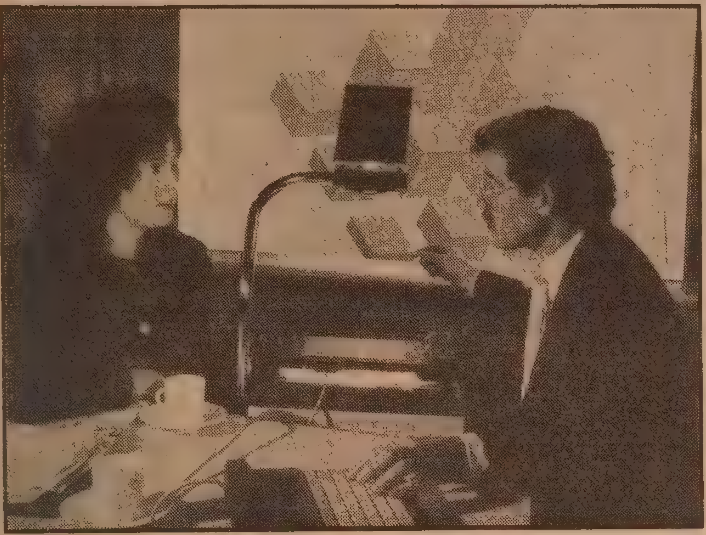

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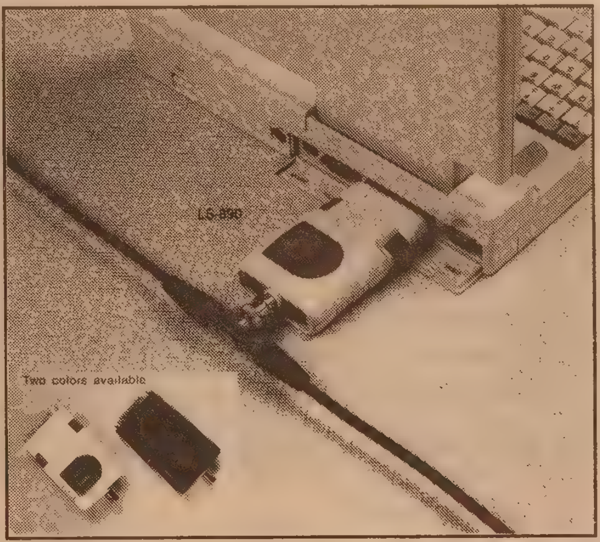

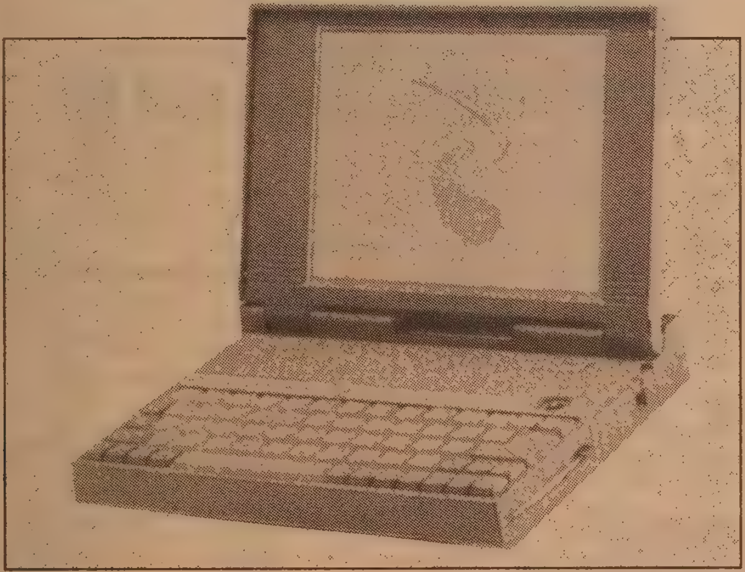

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- 101 Key Mitsumi Keyboard
- Teac 1.2 or 1.44 MB Floppy Drive
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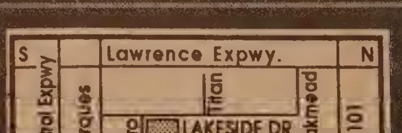

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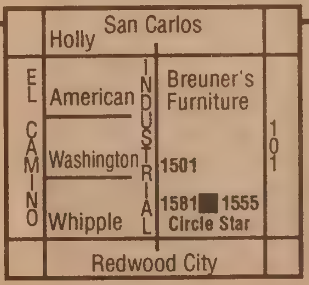

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486DX-50 VLB	$741	where applicable.			$1,417	$1,670	$1,773	$1,898
486DX-33 VLB	$600	This is a sample chart.			$1,275	$1,528	$1,632	$1,757
486SX-25 VLB	$378	Call or Fax your configuration			$1,054	$1,307	$1,410	$1,535
486DX2-66 EISA	$867	**Free mouse w/ all systems**			$1,506	$1,760	$1,863	$1,988
486DX-33 EISA	$647				$1,286	$1,540	$1,643	$1,768
486DX2-66 ISA	$764		$1,037	$1,296	$1,403	$1,656	$1,760	$1,885
486DX-33 ISA	$543	$744	$816	$1,074	$1,182	$1,435	$1,539	$1,664
486DLC-33 ISA	$345	$546	$618	$876	$984	$1,237	$1,341	$1,466
486SLC-25 ISA	$302	$503	$575	$834	$941	$1,194	$1,298	
386DX-40 ISA	$291	$492	$564	$823	$930	$1,183	**Corporate Buyers**	
386SX-33 ISA	$250	$452	$524	$782	$889	**48 hrs On-Site plan available**		
286-20 ISA	$227	$429	$501	$759	$866			

This Matrix is updated frequently, please give us a call and we will fax you the latest version VAR's and reseller's call for our reseller matrix.

All Basic Configurations [systems] include Motherboard, 1MB RAM, Mini Tower/Baby AT Case, IDE [1:1] Controller, 2SPG, 1.4 Floppy, 101 Keyboard

All ASA build systems have an in -house labor warranty of 3 years. Parts have one year warranty. Keyboard, Monitors, Printers, scanners etc. have only manufacturers warranty.

Professional Multi-Media System

486DX2-66 w/256K
AMI Enterprise III
Diamond Full Tower
32 MB RAM
AMI SCSI/LAN VLB
Diamond Viper VLB
1.2 GB Toshiba HD
1.2 MB 5.25" FD
1.44 MB 3.5" FD
TrueVision Targa+ 16
Toshiba 3401B CD-ROM
Labtec CS800 Speaker
Hitachi Accu PS21
Microsoft Mouse
Focus 9000 KB
DOS 6.0
Windows 3.1
..........$8539

Home Use Multi-Media System

386SX33 MB
Mini Tower Case
4 MB RAM
120 MB IDE HD
IDE w/2SPG
1.2 MB 5.25" FD
1.44" MB 3.5" FD
VGA w/512K
Heyna SB Compatible
Mitsumi 350ms CD-ROM
Mustang Speakers
VGA 13"(Ref 6 mon)
KeyBoard
..............$999

......................TOP OF THE LINE LOCAL BUS GRAPHICS/CAD WORKSTATIONS..........

SPECS	DIAMOND	ATI	ORCHID	NUMBER NINE	MUSTANG	PEGASUS
Motherboard	DIAMOND Fastbus	MICRONICS MX-30**	ORCHID	AMI Super Voyager**	MUSTANG**ISA/VESA	MUSTANG**EISA/VESA
Power	486-66 256K CACHE	486-66 256K CACHE	486-66 256K CACHE	486-66 256K CACHE	486-66 256K CACHE	486-66 256K CACHE
Video Power*	50 winmark	26 winmark	50 winmark	42 winmark	16 winmark	16 winmark
RAM	8MB-70 exp to 128MB	8MB-70 exp to 64MB	8MB-70 exp to 32MB	8MB-70 exp to 64MB	8MB-70 EXP TO 32	8MB-70 EXP TO 256MB
BIOS	DIAMOND	PHOENIX	AMI	AMI	AMI	AMI
Exp. Slots	2 VESA, 5 ISA	2 VESA, 6 ISA	2 VESA, 5 ISA	2 VESA, 6 ISA	2 VESA, 5 ISA	2 VESA, 6 EISA
Floppy Drives	1.2, 1.44 Teac Drives	Same	Same	Same	Same	Same
HFC/IO	32 bit orchid VLB	32 bit orchid VLB	32 bit orchid VLB	32 bit orchid VLB	32 bit orchid VLB	Promise w/2MB Cache
Case,230 UL	Med Tower 230 PS	Same	Same	Same	Same	Same
Keyboard	Keytronic/Maxi Switch	Same	Same	Same	Same	Same
Video Card	DIAMOND-VIPER	ATI-ULTRA PRO	ORCHID CELSIUS 9000	LEVEL 11	ORCHID Farenheit	ORCHID Farenheit
Spc. Features	2MB VRAM	2MB VRAM	1MB VRAM	2MB RAM	1MB DRAM	1MB DRAM
	1280X1024X256Clr 74Hz NI	1280X1024X16Clr 74Hz NI		Virtual rsltn upto 2048x1024	1280x1024 16clr 60Hz NI	1280x1024 16clr 60Hz NI
	1024x768x66kClr, 76Hz NI	Same	Same	1024x768x66KClr, 100Hz NI	1024x768 256clr 72Hz NI	1024x768 256clr 72Hz NI
32bit Proc	WEITEK P9000	MACH32	WEITEK P9000	S3 928 GUI Accelerator	S386C805	S386C805
Video Mnfr #	408-736-2000	416-756-0711	510-683-0300	617-674-0009	510-683-0300	510-683-0300
Price	**$1,727**	**$1,854**	**$1,546**	**$1,921**	**$1,419**	**$1,749**

All CPUs have a cooling fan with heat sink. * PC magazine 2.5 **Intel Pentium Socket

Add Hard Drives, Monitors, Multi Media Components, And other peripherals as per your need. [Look at our other pages for specs and prices.]

Student Multi-Media System

483SX-25 VLB
Mini Tower Case
8 MB RAM
245 MB IDE HD
IDE w/2SPG
1.2 MB 5.25" FD
1.44" MB 3.5" FD
Orchid Fah VLB w/1MB
Pro Audio Spectrum 16
Mitsumi CD-ROM
14" 1024x768 .28
Mustang Speakers
KeyBoard
CD 6PK Bundle
..........$1775

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Continental USA
Corporations please enquire
when ordering full systems.

14" TERMINAL LAN READY-VGA

(Incl. Monitor and K/B)

$369.00

LOCAL BUS

MOTHERBOARDS

(Many of our new M/Bs have Pentium Socket)

Mustang 486SX-25	$184
MustangT 486-33/50/66...w/256k......w/Pentium Socket	$437/595/666
MustangF 486-33/50/66 w/256k	$399/551/623
Pegasus vlb Elsa/Vesa Pentium ready......486-33/50/66.w/256K	**$645/790/869**
ORCHID 486-33/50/66-256K	$460/615/690
Diamond Fstbs 33/50/66.w/ideio	$504/655/728
Micronix 486-33/50/66	**$688/840/912**
AMI Super Voyager 486-33/50/66 w/256k...	**$745/893/970**
AMI Enterprise III 486-33/50/66 w/256k.... ....EISA/VESA	**$970/1117/1194**

CONTROLLERS

Mustang IDE/IO	**$41**
ORCHID IDE/IO vlb	$68
DTC 2272 VLB IDE / IO wo/Game	**$61**
DTC 2270 VLB 8.3MB/sec IDE / IO	**$79**
DTC VLB 3270 SCSI	**$120**
Promise DC-4030 VLB 4HD/2FD	$175
Forex Bus-Master VESA,50Hz	$205
BusLogic BT445S VLB Fast SCSI-II	$289
Mustang IDE/IO Cach15.6mb/sec	$170
UltraStor SCSI 34F, 32k Card..10mb/sec.	$265
UltraStor SCSI 34F, 32k Kit	**$320**
AMI SCSI VLB	**$470**

GRAPHIC ADAPTERS

(wm = winmark ver2.5)

DIAMOND Stealth 24vlb S3-805.1mbdram	$164
DIAMOND Stealth pro 1/2MB ram,36wm	$257/336
DIAMOND Viper 1/2MB,9000,50wm	$296/385
ORCHID Fahrenheit S3-805,1/2MB	$152/196
ORCHID Same w/voice annotation	$199
ORCHID Celsius 1MB	$235
ORCHID P9000 2MB	$363
GENOA ET4000	**$149**
GENOA 8500VL, cirrus logic	**$136**
GENOA 8700VL, S3-805	$180
ATI Ultra Pro, 1/2MB, 26wm	$296/352
Mustang VLBCirrus logic1/2MB	**$89/130**

NOTEBOOKS

ESCORT

386SL/25,80MB,2MB-CLR	$1760
486SLC/33,80MB,HDD,2MB	$1395

BONDWELL

486SLC/25, 80MB, HD, 4MB	$1429
486SLC/33, 130MB, HD, 4MB	$1569

TWINHEAD SLIMNOTE

386 SXL-25, 2MB, 60MB / 80MB	$1294 / $1339
486 SLC-33, 2MB, 80MB/130MB	$1650 / $1794

LEADING EDGE

386 SXL-25,4MB, 80MB	$1431
386 SL-25, 2MB, 80MB, COLOR	**$1980**

CHAPLET/SUNRACE

386 SX25, 4MB, 80MB/120MB	$1199 / $1399
486 SLC, 2MB, 80MB/120MB	**$1475 / $1599**

(........the only notebook w/SCSI port........)
Call for high end notebooks and notebook accessories....................................

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Support of RAID levels 0,1, and 5; 5 Channel Multi-thread I/O;Hot swap of drive;Novell, SCO UNIX, DOS.....
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Disk Pack Drives

Bootable, Portable, Mechanically protected Bases and Disk Packs Millitary/Government/Corporate ....data security usage
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MOTHERBOARDS

(Many MB,s have Pentium Socket) See Local Bus Section

286-12/20	**$44/59**
386SX-33/40	**$78/89**
Stallion 386DX-40 w/64k Cache	**$115**
Stallion 486SLC-25 Cyrix	**$143**
Stallion 486DLC-33/40 w/64K	**$183/235**
Stallion 486SX25	**$159**
Stallion 486DX-33 with 64/128k	**$376/386**
Stallion 486DX-33/50/66 w/256k	**$398/549/622**
Stallion EISA 486DX-33/50 w/256k	**$473/629**
Stallion EISA 486DX2-66 w/256	**$706**

Call for pricing of M/Bs w/o CPU

CONTROLLERS

IDE 2FD-2HD/4FD-2HD	$12/26
IDE w/ 2SPG..gen	$16
IDE Caching Ultrastor 15C (upto 8MB)	**$195**
IDE Caching Promise DC99M 2FD/2HD	**$105**
IDE Caching Promise DC200 2FD/4HD	**$112**
IDE Caching Promise DC2032 2FD/4HD,IO.	**$149**
IDE EISA DTC	$135
Kouwell 531 4Port Serial 16C550	$69
Kouwell 2spg 16C550	$45

SCSI

Future Domain Comp.	**$52**
Trantor SCSI Adapter	**$67**
Future Domain TMC1680 SCSI II C/K	**$165/245**
DTC3292K..7HD&4FD	$349
DTC3290AS 7HD&4HD Caching	**$486**
ADAP 1522B Card/Kit	$74/140
ADAP 1542C Card/Kit	**$199/245**
ADAP 1542C+ Kit	**$310**
ADAP 1742 EISA Fast SCSI2 C/K	**$363/419**
ALWAYS IN2000/IN2000-Pro SCSI1	$179/225
BusLogic BT545S ISA Fast SCSI2 Kit	**$239**
BusLogic BT747S EISA Fast SCSI2 Kit	**$395**
Ultar24F EISA SCSI HD/FD	**$365**
Promise DC2040 Caching(upto 16MB)	**$215**
AMI EISA Cache	**$499**
DPT Smart CachePlus+EISA SCSI	$427
Trantor348 Parallel Port to SCSI	$179

ESDI

DTC	$127
Maple 64K new version	**$130**
Ultra 12C 1/4MB	**$370**
Ultra 22F Caching EISA	$340

ADAPTERS

(See Local Bus and CAD Sections too)

MGP	$12
Color Card	$23

VGA/SVGA

VGA	256k	$24
Trident	512K/1MB	$35/52
Tseng	1MB	$78
Mustang	1MB Window Accel	$58
Diamond	**Speedstar Pro**	**$139**
Diamond	**Stealth 24**	**$164**
Fahrenheit	Plus wo/w VA	$165/219
Hercules Graphite	HG210SVGA 1280x1024I w/1MB	$255
Hercules Graphite	HG420SVGA 1280x1024I w/2MB	$440
AMI Fast View w/2MB Weitek P9000		**$call**
AMI Fast View EISA VGA Graphics w/1MB		**$call**
ATI Ultra Grpx 1MB w/Mouse		**$239**
ATI Ultra Plus w1/2MB		**$219/245**
ATI Ultra Pro w1/2MB		**$329/365**

Fault-Tolerant Servers

w/ Disk Mirroring, Disk Duplexing, Synchronous Disk Support. Novell, SCO Unix, DOS, OS/2....
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Export PCs.

386-SX33M/B,1MB,1.44 and 1.2 FDD, 40MB HDD, IDE/2SPG, most languages K/B,Mouse, 100/220V
13" VGA/14" SVGA....$535/589

MONITORS

MONO

Mono 12"	$78
Mono 14"....amber/white	$89
Mono 9" VGA	$125
Mono 14" SVGA 1024 x 768	$112

VGA/SVGA

VGA 13" .28 Color.refurb..1yr	**$160**
VGA 14" 640 x 480, .51	$166
SVGA 14" 1024x768 .39	$197
SVGA 14" 1024 x 768, .28 dpi	**$237**
CTX Autoswitch 1024, .28 dpi	$249
SVGA 14" 1024x768 .28 NonInt	$257
Black SVGA 1024,.28 I/NI	**$279/320**
Mitac 17" .26 1024	***$659***
CTX 14" 1024 .28dpi Hitachi NI	**$269**
Viewsonic V6E 14", 1024 .28 NI	$323
Viewsonic 15, 1280 .28 NI	$530
Sony 1430S 14" 1024 MicroPro MPRII	$573
Mitac 1564S15" .28 dpi 1280x 1024	**$399**
Samsung15" NI Flat .28dpi 72 Hz	$449
Sampo KDM1566 15" 1024 .28 NI	$439
Mitac 17" .31dpi 1024 72Hz NI	**$475**
Sampo KDM1766 17"	$655
Maganavox20" 1280 x 1024 NI	**$1285**

See Many High-End Monitors in the Engineering/CAD Section.

CASES/PS

Baby Desk/Tower w/ PS	**$49**
Medium Tower	**$77**
Full Tower/Super T. w/PS	**$89/155**
Rack Mount W/PS	**$259**
File Server w/ 400W PS, 3 Fans ....12 F/HDD, black/beige	**$439**

DIAMOND (Black/Beige)

Baby Desk/Tower w/PS	**$79/82**
Medium Tower Reg/Big w/PS	**$89/119**
Full Tower w /PS	**$129**

External HDD Cases

1HH...65W	**$89**
1FH/2HH...65W	**$110**
2FH/3HH...65W	**$137**
SCSI Cables Int/Ext	**$9/10**

Power Supplies

XT Power Supply	**$34**
PC Power XT Turbo Cool 230	**$80**
PS2 200/300W	**$40/95**
Full Tower 230W	**$58**
Full Tower 300/400	**$80/154**

KEYBOARDS, MICE

Spill Resistant/Mitsumi	$19/17
MaxiSwitch / M-Click	$31/34
KeyTronic	$35
BLACK 101	$39
SEJIN J-Mouse(mouse under 'J' Key)	**$89**

Also line of European/Arabic KBs

S-Mouse/TBall	$9/21
LogiTech wht box Ser/Bus	$33/45
LogiTech MouseMan Ser/Par	$64
Microsoft white box S/B	$39/69
BLACK SERIAL	**$19**

Tel: [408] 496-6953 ASA COMPUTERS Fax: [408] 988-0359

DRIVES

Floppy Drives

YE Data 1.2/1.44MB	$47/42
Teac 1.2/1.44MB	$49/43
Teac Dual Floppy 1.2 + 1.44 MB	$121
YE Data/Teac 2.88 MB	$82/89
Toshiba 2.88MB	$63
.....w/contl & 2.88 floppy disk	$94

IDE

ST/CON 40MB 25 msec	$105
CON 80MB 19 msec	$159
QUN 85MB 17 msec	$182
CON 120MB 19 msec	$170
QUN 127MB 17 msec	$208
MXT 130MB 15 msec	$180
CON 170MB 17 msec	$185
QUN 170MB 17 msec	$225
CON 212MB 12 msec	$220
MXT 213MB 15 msec	$222
QUN 240MB Fast 10,11ms	$314
MXT 245MB 15 msec	$240
WD 240MB 12 msec	$240
CON 340MB 12 msec	$320
WD 340MB 12 msec	$315
MXT 345MB 15 msec	$315
QUN 525MB Fast	$862
FUJ 540MB 12 msec 5yr	$669
CON 540MB 12 msec	$669
WD 425MB 11ms	$445

SCSI - 3.5"

QUN 85/127MB 17 msec	$185/210
MXT 130MB 15 msec	$195
CON 170MB 17 msec	$204
MXT 213MB 15 msec	$255
CON 212MB 12 msec	$279
QUN 240MB Fast	$319
MXT 340MB 15 msec	$397
FUJ 520MB 11 msec 5 yr	$679
QUN 525MB Fast	$862
CON 540MB 12 msec	$765
QUN 700MB <10 msec	$1105
TOSH 877MB 12.5 msec	**$835**
H-P 1.2GB 10.5 msec	**$1221**
QUN 1.0GB 10 msec	**$1125**
MXT 1.2GB 8 msec Magix	**$1150**
ST 1.2GB 10 msec	$1030
FUJ 1.2GB 10 msec	$1075
QUN 1.2GB <10 msec	$1275
TOSH 1.2GB 12 msec	**$930**

SCSI - 5.25"

ST 1.2GB 14 msec	$1099
MXT 1.2GB 13 msec Panther	**$930**
FUJ 1.2GB 14 msec	$1040
H-P 1.7GB 11.5 msec	**$2162**
MXT 1.7GB 13 msec Panther	**$1170**
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ST 1.6 GB 14msec	$1260
FUJ 2.0 GB 11 msec	$1836
ST 2.1GB 14 msec	**$1575**
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H-P 2.4GB 11.5 msec	$2537
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...Colorado KE-10 External kit with card	$105
....Colorado External port card	$37
...FC-10 high perf card	$85
Colorado Trakker 120 / 250MB	$299 / 340
Summit Express 305MB 10Mb/sec	$264
Archive Viper 250MB hh SCSI I/E	$349 / call
Archive Viper 250MB w/QIC,15MB/min,1"H	$179
....w/Central point SW add	$20
Viper 525MB hh SCSI Int/Ext 6MB/sec	$549/950

(>500MB for PC / SERVER)

Colorado 700MB	.689
.......FC-15 high perf card	$181
Colorado 2.4 / 4.0 GB Qic 5.25	$969 /, 1499
YE DATA 1.2GB SCSI...DAT	**$529**
Python 4[8]GB 3.5" DAT SCSI .5m I/E	$1195/1587
HP 2GB DAT 4mm Int/Ext	$1095/1245
HP 5GB DAT 4mm Int/Ext	$1320/1475
MAYNARD 2GB 4mm DAT Int/Ext	$1890 / 2060
MOUNT FS1200 4mm DAT Int/Ext	$1840/2133
EXABYTE 2GB 8mm DAT HH Int/Ext	$1485 / 1815
EXABYTE 8250 5GB HH 2yrs Int/Ext	$1795 / 1875
EXABYTE 8505 10GB HH 2yrs Int/Ext	$2475 /2770

..(above drives require special contr & soft drivers)

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ST 720A 1.8" 20.9MB IDE < 1.5ms	call
ST 740A 1.8" 41.9MB IDE < 1.5ms	call

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Floppy 1.2 Bulk	$.49
Tape DC2000XL	$18
Tape DC2120 250MB..Formatted	$18.5
Tape DC 6250 5.25", 1/4" Cartridge	$27
Tape DC 6525 5.25", 1/4" Cartridge	$31
TK50 for DECs	$26
DT-2400 2.4GB .25" Cartridge	$54
DT-4000 4.0 GB .25" Cartridge	$57
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Syquest 44MB Cart	$63
Syquest 88MB Cart	$96
Syquest 105MB Cart..(IDE)	$96
Bernoulli 44MB 3Pk	$315
Bernoulli 90MN 3Pk	$415
Magneto-Optical 650MB Cartridge	$159

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650MB 5.25"	$109
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SOFTWARE

UTILITIES

Norton Utilities V6.01	$115
Norton Anti-Virus V2.1	$85
QEMM 386 V6.0A	$59
After Dark V2.0A	$29
PC Tools V8.0A	$119
After Dark For Windows	$32
Auto Doubler V1.07	$55
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Stacker 3.0	call

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Harvard Graphics V3.06/WIN	$379
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Super Laser Spool	$109
Norton Desk Top/WIN	$107
Micrographx Graphics Works	$179
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More Fonts 3.0	call
Approach V2.0 WIN	$255

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FileMaker Pro For Windows 2.0	$305
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FoxPro For DOS 2.5 Upgrade	$199
FoxPro LAN (6-Pak)	call
Paradox V4.0	$479
Paradox For WIN	$135
Q & A 4.0	$210
Superbase 2.0 WIN	$535

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CA-Accpac Simply Accounting DOS	$79
DAC Easy Accounting/Payroll 4.3	$95/97
Peachtree Complete Accounting	$179
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Quicken For Windows	$47
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WordStar 7.0	$269
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Hitachi

CM1584MV 15" FST .28, 1280NI, MPRII	$479
CM1785MV 17' FST, .28. 1280NI, MPRII	$895
CM2095 20" 1280 Anti Glare	$1345
CM2087 20" 1280 72Hz Microp	$1675
CM2187 21" FST 1600x1280 Microp	$2145
ACCUVUE PS-21FST, .28. 1600x1280, Micr	$2220

Toshiba

P17CU01 FST 1024..31automode.($649*)	$679
P21CR 21", .31, 1280NI, MPRII	$1925

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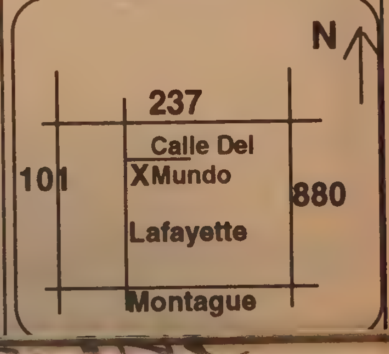

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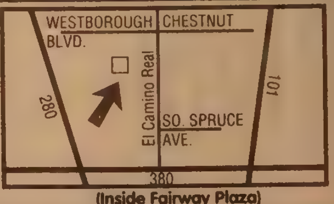

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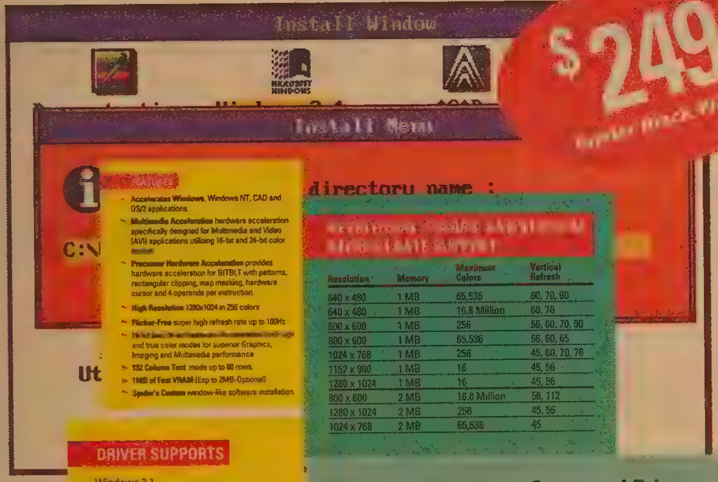

$249 Spider Black Widow

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- [illegible] and true color modes for superior Graphics, Imaging and Multimedia performance
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- **Spider's Custom** window-like software installation.

Resolution	Memory	Maximum Colors	Vertical Refresh
640 x 480	1 MB	65,536	60, 70, 90
640 x 480	1 MB	16.8 Million	60, 70
800 x 600	1 MB	256	56, 60, 70, 90
800 x 600	1 MB	65,536	56, 60, 65
1024 x 768	1 MB	256	45, 60, 70, 76
1152 x 900	1 MB	16	45, 56
1280 x 1024	1 MB	16	45, 56
800 x 600	2 MB	16.8 Million	56, 112
1280 x 1024	2 MB	256	45, 56
1024 x 768	2 MB	65,536	45

DRIVER SUPPORTS

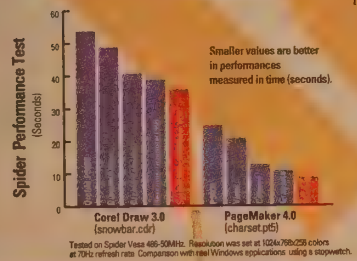
Windows 3.1
OS/2 Version 2.1
AutoCAD Release 11 & 12
AutoSHADE Release 2.0
VersaCAD Version 7
CADKEY Version 6.0
PCAD 5.1
Microstation 4.0, 3.1, or later
WordPerfect 5.1
Lotus 1-2-3 Release ~~2.X~~
Symphony Release 1.1
VESA VGA BIOS extension

Drivers are updated and added on a regular basis. Check the Spider Bulletin Board or contact Spider Technical Support for availability.

Compared Prices

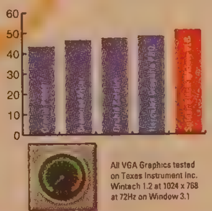
Orchid P9000 (Weitek P9000 Chip)	$599
Diamond Viper (Weitek P9000 Chip)	$599
Orchid Celsius (IIT X15)	$499
Hercules Graphite PRO VLB (IIT X15)	$599
Spider Black Widow (IIT X15)	$249

Spider Black Widow VGA base on X15 chip from IIT. (IIT X15 selected editor choice on Windows Magazine, PC Magazine and InfoWorld)



Smaller values are better in performances measured in time (seconds).

Tested on Spider Vesa 486-50MHz. Resolution was set at 1024x768x256 colors at 70Hz refresh rate. Comparison with real Windows applications using a stopwatch.

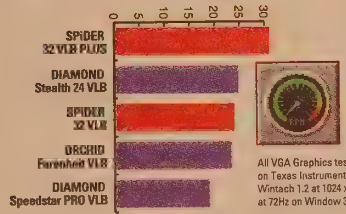


All VGA Graphics tested on Texas Instrument Inc. Wintach 1.2 at 1024 x 768 at 72Hz on Window 3.1

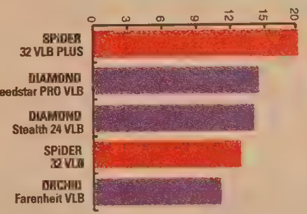
Spider 32 VLB/Plus

Performance Test	SPiDER 32 VLB PLUS	SPiDER 32VLB	ORCHID Farenheit VLB	DIAMOND Stealth 24 VLB	DIAMOND Speedstar PRO VLB
WINTACH 1.2	31.5	23.81	23.10	24.72	18.77
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
RETAIL PRICE	$155.00	$125.00	$240.00	$210.00	$170.00
[illegible] UPGRADE	YES	YES	YES	NO	NO

(Test on 486-50DX with Windows 3.1 in resolution 1024x768x256 Colors, 1MB RAM on following motherboards chipset SIS, CONTAQ, OPTI, UMC, USA CHIP SET)



All VGA Graphics tested on Texas Instrument Inc. Wintach 1.2 at 1024 x 768 at 72Hz on Window 3.1



ZD Labs

PC Magazine ZD Labs' WinBench V3.11 test results were performed by Spider Graphics Inc. Independently of any testing performed by Ziff-Davis Publishing

Driver Supports:

Windows 3.0, 3.1
AutoCad R.9, 10, 11, 12
GEM Ver 2.2
Lotus 1-2-3 R.2.0, 2.1, 2.2
Symphony R1.1
Ventura Publisher Ver 1.1, 2.0
WordPerfect 5.0, 5.1
Wordstar 4.0
Autodesk 3D Studio
OS/2 PM Ver 2.0
AutoDesk-Shade Ver 2.0
PCAD
MS-Word

Specifications:

Bus Compatibility
Supports VESA LOCAL BUS (VL-BUS)

Resolution	1 MB	2 MB
640 x 480	16.7 M Colors	16.7 M Colors
800 x 600	64K Colors	64K Colors
1024 x 768	256 Colors	64K Colors
1280 x 1024	16 Colors	256 Colors

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ECS Motherboard, 128K Cache w/o CPU	145
HOT 128K Cache w/o CPU	115

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Contura Lite 20/25			
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Deskpro 386/20,20e,25e			
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	8 MB	128877-001	294
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486DX-50/64K ISA	$494	$642
486DX-33/64K ISA	$360	$516
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486 DX-33/256K EISA VESA	1139
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486 DX-50/64K ISA	1205
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MEDIAVISION ProAudio Spectrum 16	180
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ATI Graphic Ultra Pro w/2MB	340
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Nanao F340iw	664
NEC 3FGE/ 4FGE	583/684
NEC 5FGE/6FGE	1,135/2,297
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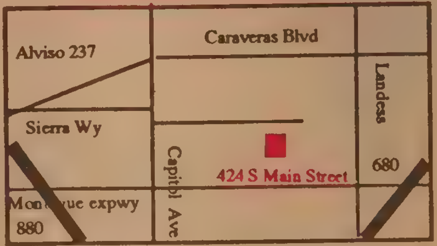

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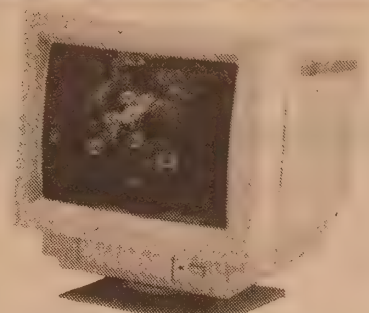

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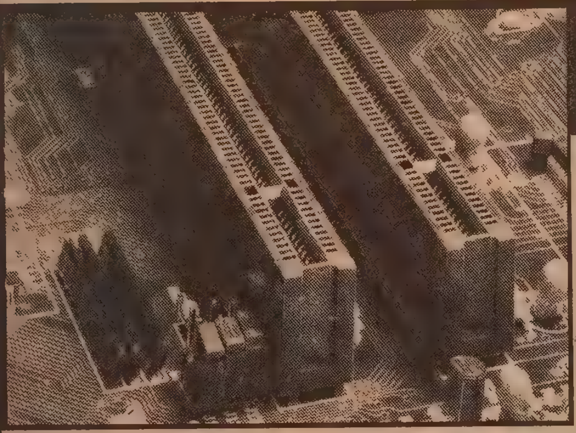

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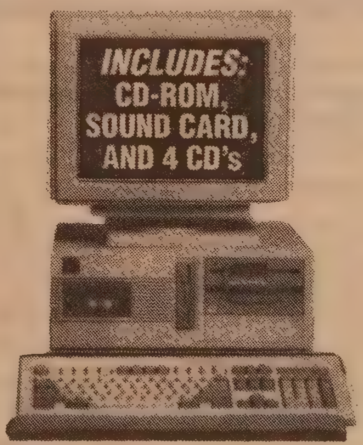

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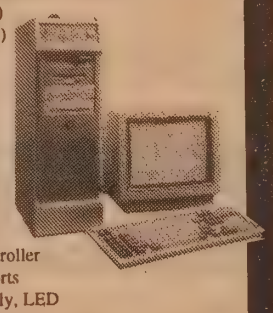

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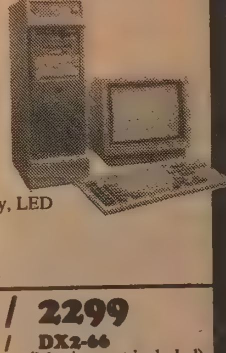

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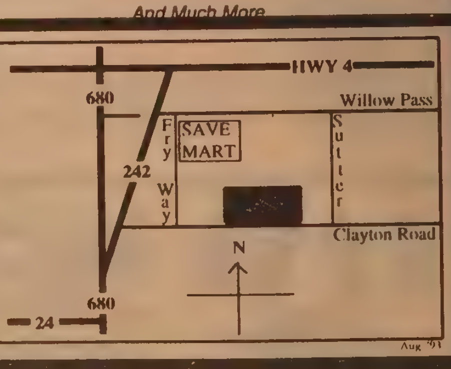

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Almost Fifty-Five Years After Its Legendary Beginnings In Bill And Dave's Garage, Hewlett-Packard Finds New Levels Of Technological Innovation And Customer Responsiveness

By Michael Robin • Photos: Paul Winternitz

Founded in 1938 by Dave Packard and Bill Hewlett in Packard's garage, Hewlett-Packard Company may be the original Silicon Valley "garage start-up." After decades of growth and success, in a wide range of technology fields including electronic instruments, measurement devices, minicomputers, workstations, and calculators, HP appeared, a few years ago, to be heading in the direction of its major competitors, IBM and DEC—namely, into disarray and decline.

However, the founders had other plans. Bill Hewlett, who retired as vice chairman of the board of directors in 1987, and Dave Packard, current chairman of the board, stepped back in to reinvigorate the company and reassert a style of organization captured in the term "The HP way."

The product that best symbolizes HP's redirection is the printer. Until the early 1980s, Hewlett-Packard largely sold printers as peripheral, or secondary, devices to its minicomputer systems. That all changed under the leadership of Richard Hackborn. Taking advantage of a corporate structure that allowed him to try something new, Hackborn built a very independent printer division in Boise, Idaho. Recent studies show that printers now account for 40% of HP's income before interest and taxes, and they are clearly an industry leader in the desktop laser and inkjet printer markets. Likewise, HP has experienced impressive growth in the workstation market, moving ahead of DEC to become No. 2, after Sun Microsystems.

Revitalization in the desktop PC market has been slower, with the benefits only now beginning to show. According to recent market research by BIS Strategic Decisions, shipments of HP's PC products in 1993 have increased about 130% over the same period a year ago, moving HP into the top ten PC vendors worldwide.

Overall, HP is one of the few large computer companies whose total number of employees has actually been growing—from 85,000 in 1985, to 91,500 in 1990, and reaching 93,800 at the close of its 1992 fiscal year.

Helping to lead this growth is Boris Elisman, manager of product marketing and programs for desktop personal computers. Still in his early thirties, he is part of the new generation of leadership at HP. Before joining HP, Elisman was an engineer at AT&T Bell Labs designing ISDN circuitry. He came to California to attend business school and took a summer job in the Personal Computing Division at HP. That was four years ago, and he stayed on. "This is back when we were not successful in PCs, now we are," Elisman says with a grin. "I went through the whole gamut of not being a successful PC player to the pinnacle of where we are today—at the top and growing."

Elisman also points out that his combination of technical and marketing skills is not rare at HP. "People like that are drawn to HP because HP is known as a very good engineering company. One of the things it lacked in the past was marketing. That has been changing over the last couple of years and we are doing a lot better. For me, I like marketing for the closeness it gets me to the customer and also the business aspects of marketing. But at heart I am still an engineer—I like things, I like technology. I don't want to crunch numbers or something like that."

We met with Elisman on a warm June day in Sunnyvale. True to the HP way of open communication, there are few private offices; after a short search, we found a meeting table off to the side for this interview.

During the 1980s, HP turned itself around and has enjoyed renewed success and growth. What did you change?

There are certain basics to the personal computing industry: You have to have the right product, at the right price, at the right time.

If you look at us back in 1989, or early 1990, we certainly didn't have the right price. At that time, we didn't have the best products. And our product introductions were lagging behind other industry leaders, such as Compaq.

We've had new management and reorganization in the '89–'90 time frame. The management focused on those three basics, without taking away one of the things HP has always done and really been known for—high-quality products.

The whole strategy started about three years ago, but it takes a while to implement it. It really didn't start to be felt until the summer of 1992, when we

> *"The HP way, when you really come down to it, is respecting the integrity of the individual."*
> *—Bill Hewlett, 1987*

introduced the 486U PC series. Ever since then it has been up in terms of customer satisfaction and sales.

Other older computer companies, such as IBM, have not been able to balance entering the PC market and remaining in mainframe or minicomputer markets. What is HP doing that is different?

It's a different strategy. IBM compromised on their desktops so that the desktops would not hurt the sales of their minicomputers and workstations.

One of the things that we leverage off heavily, as a PC business, is the Hewlett-Packard name. Hewlett-Packard has been a company for fifty-four years. The studies that we've done show that just saying "Hewlett-Packard" means certain things to people—great products, well-designed and -engineered products, great quality or reliability. One of the things we are trying to impress upon our customers now, is that it means all those things at a *reasonable price*—not at the high price we were two or three years ago.

Even though we sell RISC-based workstations, we are also one of the first vendors to introduce a Pentium-based PC, both server and desktop. We know that if we don't offer the proper product to our customers, our competitors will. We would rather cannibalize from ourselves than have the competitor take the customer away. It is really giving customers a choice.

Who have those customers been?

We primarily sell to corporate customers, both large businesses and mid-sized businesses. It spans the gamut from insurance companies, financial institutions, manufacturing companies, utilities, and banking. We have had success in many vertical markets.

How much of HP's PC market is in the US?

About 40% of sales are in the US. It is actually growing because the US economy is doing a lot better than the European economy. HP has a large PC presence in Europe; we are also doing extremely well in Latin America and Asia Pacific. In Mexico, for example, we are the number one PC manufacturer.

How closely connected is the PC division's success tied to other parts of the HP line—servers, minis, etc.?

To a certain extent, quite a bit. If you look back in the '90–'91 time frame, about 30% of our PCs were sold into installations that already had HP 3000 or 9000 minicomputers, and workstations. Today that percentage is smaller, but is still a significant percentage of our sales.

With Pentium, the power of desktop PCs is closing in on the workstation. What is your relationship with the workstation division?

Today we are still managed as separate businesses. We work together to explain our positioning to customers. But they are still interested in selling as many workstations as they can sell, and we are interested in selling as many PCs as we can sell.

Even thought the line is getting hazier and hazier, there are some differences. The application really drives the choice whether they want a UNIX RISC-based environment or they want a DOS- or Windows-based Intel environment. We don't have too many situations where the customer is really confused. If the decision is made to go with a robust custom application in a mission-critical environment on the desktop, they will probably choose a UNIX-based environment, probably choose a RISC-based workstation.

If the decision is to have something that's compatible with tens of thousands of shrink-wrapped applications and offers an installed base of millions, they'll go with an Intel-based solution.

> ”Even though we sell RISC-based workstations, we are also one of the first vendors to introduce a Pentium-based PC, both server and desktop. We know that if we don't offer the proper product to our customers, our competitors will. We would rather cannibalize from ourselves than have the competitor take the customer away.“

As operating systems such as NeXTSTEP or NT are available on both platforms, the distinction blurs even further.

At the high end, yes. To some extent with NeXTSTEP, to some extent with Windows NT running on RISC-based workstations.

Things like price and installed based will affect their decision as well as need. A Windows NT-based PC will be a much more expensive PC than a Windows 3.1-based PC because you need 16MB of memory, at least a 200MB disk, and you need either a very, very fast 486, like a 486/66, or a Pentium machine to run it adequately. The majority of the market is not there. The majority of people today buy a 486/25 or a 486/33.

HP's announcement of supporting NeXTSTEP on the PC has created new excitement and interest in NeXTSTEP. How important do you see NeXTSTEP being in your product line?

Today it is not very important. We do have some customers that are very interested in NeXTSTEP, and we are working with NeXT to make sure that our PCs are fully compatible with all the proper drivers, etc. NeXT is working with us because they are interested in their system being fully compatible with our PCs. But today there is not an overwhelming flow of customers, it is more like a trickle.

The future? That all depends on what is going to happen with Windows NT, with Solaris, with NeXTSTEP, with OS/2… NeXTSTEP, given where they are in the market today, is the underdog.

How close do you work with the PC software division?

Very close, they sit right next door to us. As an overview of structure, there is a desktop PC division; a server PC division; a division for mobile appliances; and a PC networking division, which does hubs, routers, network infrastructure products; and a PC software division, which develops software for networking products such as OpenView and develops products for PCs such as Dash Board and NewWave. It also develops software for mobile devices for transferring files between PCs and mobile devices.

Software is really a glue that unites all of these divisions together. These five divisions report to one general manager, so there is a person who is responsible for the overall business. All of them are sold by the same sales force, all of them are trained by the same people—basically a very cohesive sales and marketing team.

There is definitely coordination of the develop-

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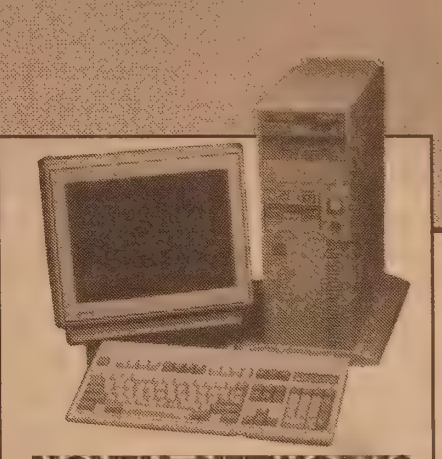

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ment end as well. But still, every division is responsible for their own profit and loss. If they need to develop products that will cannibalize [another division], that is what they have to do. And it will be supported by the upper management.

Let's look at the technology, at the PC. Using the desktop as the linchpin, HP is building in connectivity across its systems, for instance, to servers and minis as well as to new mobile computing devices.

HP is bringing PCMCIA slots to the desktop and recently introduced a wireless infrared (IR) technology. Is IR technology designed primarily for moving small files, while larger chunks of information will best be transferred on PCMCIA cards?

That is the way we are positioning it today—if you need to transfer an individual file or several smaller files, you should use the infrared link. But if you want to move a megabyte of information or to copy 10MB of your disk, it would be much, much faster to do it through the PCMCIA technology.

The infrared, at 115K with a range of about 18", is a standard feature on our Vectra XM PCs. It is very inexpensive to include. We are not asking customers who don't want that feature to pay more for it.

The PCMCIA accessory, costing about $250, is an option that you can buy with our Vectra Ms, XMs, and other PCs. That will allow you to easily transfer large files.

Is this the start of the IR? We will certainly try to improve the transfer speed. Right now, we are trying to make the SIR, serial infrared link, a standard. We have had companies such as Sun and Intel sign up.

How is it being licensed?

The license policy is a one-time fee of $5000 for the technology. You don't pay royalty on a per-unit basis. We want to make this a standard. We want people to start incorporating it into printers, mobile devices, desktop PCs, everywhere.

What is your vision for PCMCIA?

The PCMCIA accessory that we offer gives you access to two Type II slots or one Type III. Kitty Hawk, our small disk drive device, is a Type III device.

Let me give you a couple of scenarios.

One option with notebook PCs is to use them with a docking station—you come in, you plug your PC into the station, and it gives you access to a monitor.

Another option is to take your operating environment from your mobile device, put it into your PC, and use your PC. Basically, what you can do is remove the Kitty Hawk drive from a mobile device, put it in your PC, and it's a logical drive in your PC. You now have the power of the PC with graphics, etc. But the operating environment is exactly your mobile PC's operating environment, you don't have to change anything.

"The application really drives the choice. If the decision is made to go with a robust custom application in a mission-critical environment on the desktop, they will probably choose a UNIX-based environment, probably choose a RISC-based workstation.

"If the decision is to have something that's compatible with tens of thousands of shrink-wrapped applications and offers an installed base of millions, they'll go with an Intel-based solution."

What sort of connectivity is being built into the desktop going upwards toward the server?

We are evolving to incorporating the Ethernet 10BaseT technology right on the motherboard. Today you can buy three of our PC platforms with integrated 10BaseT connection—the HP Vectra NI, MI, and XM. This is just standard. In future platforms, for example the Pentium-based XP, we'll also incorporate this on the motherboard. This gives you faster throughput, but also much less expensive connection than adding in a card.

If you look at things a year or a year and a half from now, we are also thinking about incorporating the 100BaseVG, which is 100MB/per second technology, also into our desktops.

On June 17 of this year, the EPA's Energy Star program was formally launched. Although it's a voluntary program, to meet these new standards PCs, monitors, and printers must be capable of entering a low-power state of under 30 watts during inactivity or sleep mode. The EPA estimates that users of Energy Star compliant computers will save $2 billion annually. What are HP's plans?

HP will have most of its PCs Energy Star compliant. There are some PCs, such as the Pentium-based PCs or 486/66 PCs, that will not be. They just consume too much power, or the chips themselves consume too much power.

The other PCs, like the 25MHz-based PCs, 486/25, 486/33SX, all will be; that is in normal operational mode, even without the power down. In normal operational mode they will consume less than 30 watts of power, which should save our customers a lot of money.

We are also developing a monitor that will be Energy Star compliant. This will be a big 21", 1600 x 1280 monitor that will have a power down mode and will be Energy Star compliant.

Beyond Energy Star, a month ago HP announced we no longer use CFCs in our manufacturing process throughout the whole company. That program cost us something on the order of $60 million, but the benefits definitely outweigh the costs. Some additional things: Our PCs don't use any paints—neither the plastic nor packaging are painted. Also, the RFI shielding can be more easily stripped away so that both the metal and the plastic can be recycled. We are trying to design the whole "green PC" concept as a standard feature.

Part of the turnaround you've accomplished has been through maintaining quality, lowering prices, and meeting customers' needs. What's next? Is there something on the horizon?

The challenge is not to get cocky, basically not to rest on our laurels, just keep listening to customers. Keep designing PCs that meet their needs—at the right time, at the right price.

We are going to be incorporating more networking features into our PCs, to allow easy connectivity to networks. We are also going to be incorporating more of this technology that we call business communication, which allows businesses to share information. You've seen some of this with the recent introductions [such as SIR] for sharing infor-

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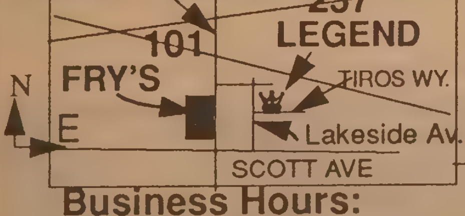

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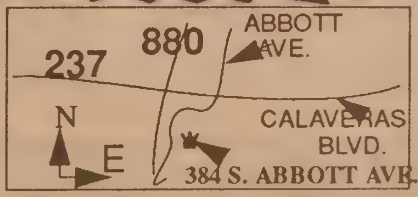

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mation between the desktop and mobile PCs. In the future we will also be introducing technologies that will allow people to easily share voice mail, phone, and fax information.

During July, HP is introducing a new, lower-end line, the HP VL.

Yes, the HP Vectra VL. It's all 486s—25SX, 33DX, DX2.

This is still focused on a corporate customer, but a corporate customer that does not desire all the features—such as networking, security, end-user diagnostics—and is not willing to pay for them. They want a high-quality PC with good performance at a low price. That is the primary target customer.

Right now it's not as easy to buy our PCs for the home user because we aren't in the Price Club, K Mart, or channels where a lot of the end-users buy. We are in computer dealer stores. (In fact, stores that advertise in *MicroTimes* carry our PCs and will offer the new VL series.)

What is the upgrade path to the Pentium for your 486s?

Some of our 486s like the N/NI, M/MI, and XM series are upgradable to the Pentium OverDrive technology; this is the P24T. They are not upgradable to the full 64-bit Pentium. The XP will be a full 64-bit Pentium PC.

There is a lot of confusion because a lot of manufacturers say, "Yeah, we're upgradable to Pentium." What they don't say is upgradable to Pentium OverDrive, and not Pentium. The end-users may not realize the differences. The Pentium OverDrive, when and if it comes out, will be a technology that you can chip upgrade from a 486 PC, just with a chip.

For the full Pentium you really have to have a different bus architecture. It is a 64-bit architecture versus 32. There are several manufacturers that do that, but through a full microprocessor card which has the memory controller, etc. It will actually be very expensive to upgrade to a full Pentium. When you buy a PC today, you are probably not going to upgrade for probably three years. Three years from now you will be able to buy a Pentium PC for what we pay for a typical 486 today. A lot of times it's a comfortable feeling; it's nice to know that you can upgrade if you want to. But what happens in reality is because of the price performance you buy a brand new PC—the video is ten times better than the one you bought three years ago, the drives are ten times faster, and the price is similar to what you would pay for an upgrade card anyway. So you would just go for a new PC.

"The HP Way" is highly respected, yet there are probably not many people who could describe what it is, how people learn it. What does it mean on a daily or practical level?

HP Way means certain things. The things that come to mind, for me, are things like respect for the individual, management by objective, concern for the community, things of that sort.

How do you learn the HP Way? Primarily through experience and osmosis. HP is a company that definitely has a certain culture which embodies those things that I talked about, such as respect for the individual. The people that tend to be managing at HP are the ones that follow the HP way. So that the managers that I have, the managers they have, follow things like management by objective. You don't have a person telling you how to do every little step of the business. You have an objective, then it is up to you, with coaching from your manager, to reach that objective. What this really means is that you get the most creativity from your people because there are no predisposed concepts that you impose down onto them.

It's management by walking around, by keeping in touch from the highest levels down—from vice presidents or executive vice presidents down to immediate supervisors walking around talking to people to keep the pulse of what is going on in the business.

It's an open door policy. There are no doors in HP cubicles. And if you go to [CEO] Lew Platt's office, who is managing a $20 billion business, you'll see there are no doors even on his office. The open door policy means that you can go in, address your concerns or needs with any of HP's managers, and they'll be willing to listen to you.

It is definitely evolving, because the business environment makes it so that we need to evolve if we want to be successful. But I think the core beliefs are still there. ■

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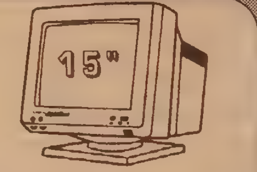

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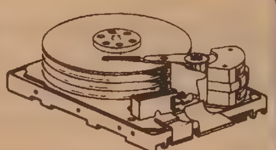

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213MB IDE 15ms (Maxtor 7213A)	$213
245MB IDE 15ms (Maxtor 7245A)	$238
340MB IDE 14ms (Maxtor 7345A)	$298
540Mb IDE 8.5ms (Maxtor MXT-540A)	$868
340Mb SCSI 14ms (Maxtor 7345s)	$398
540MB SCSI 14ms (Maxtor MXT-540s)	$848
1.2Gb SCSI 13ms (Maxtor PO-12s)	$918
1.2Gb SCSI 8.5ms (Maxtor MXT-1240s)	$1168
1.7Gb SCSI 13ms (Maxtor P1-17s)	$1188

Quantum

245MB IDE 16ms 256Kb Cache (LPS240A)	$278
245MB SCSI 16ms 256Kb Cache (LPS240s)	$288
525MB SCSI-II <10ms 256Kb Cache (LPS525)	$738
700MB SCSI-II <10ms 256Kb Cache (PD700)	$888
1.0GB SCSI-II <10ms 256Kb Cache (PD1050s)	$1088
1.2Gb SCSI-II < 10ms 512Kb Cache (PD1225S)	$1158

Fujitsu

520MB 12ms IDE (M2624T) 3.5"	$698
520MB 12ms SCSI-II (M2624FA) 3.5"	$678
1.2GB 10ms SCSI-II (M2694SA) 3.5"	$1078
2.4GB 12ms SCSI-II (M2654SA) 5.25" FH	$1898

Conner

170MB IDE 17ms (CP30174E)	$188
212MB IDE 12ms (CP30204)	$218
250MB IDE 14ms (CP30254)	$255
510MB IDE 12ms (CP30504)	$528
540MB SCSI 12ms (CP3540)	$688

Mircopolis

1.5GB SCSI 15ms (MC 1528)	$978
2.0GB SCSI 14ms (MC 1548)	$1398
2.4GB SCSI 11ms (MC 1924)	$2368
3.6GB SCSI 11ms (MC 1936)	$3168

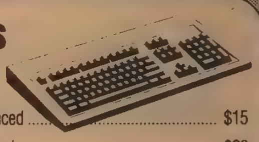
Teac

1.2Mb Floppy Drive (TEAC)	$48
1.44Mb Floppy Drive (TEAC) w/ Bracket	$48
2.88Mb Floppy Drive (TEAC)	$Call
1.2Mb and 1.44Mb Combo (TEAC)	$Call

CD ROM Drives & Software

Mitsumi CD-ROM w/ Controller (350ms)	$188
PanaSonic CD-ROM w/ Controller (350ms)	$218
TEXEL DM-3024 SCSI internal (265ms)	$358
NEC CD-R-84-1 SCSI-ii internal (280ms)	$445
Toshiba XM-3401B SCSI 256K Cache (200ms)	$445

KEYBOARDS



Keyboard 101 Enhanced	$15
Keyboard 101 Keytronic	$28
Keyboard 101 Enhanced Click (NTC)	$25
Keyboard 101 Enhanced Click (NMB)	$45
Keyboard Focus 9000 CLick w/ Calculator	$65
Keyboard 101 w/ TrackBall (Qtronic)	$65
Keyboard Ultra (NorthGate)	$95

MODEMS

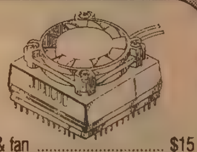
Modem 2400 & Fax 9600	$48
GVC Modem 14.400 & Fax 14,400 (Internal)	$148
GVC Modem 14.400 & Fax 14,400 (external)	$168
US Robotics Sporter 14,400 (Modem & Fax) Int.	$168
US Robotics Sporter 14,400 (Modem & Fax) Ext.	$188

MICE

3 Buttons Mouse Serial $8.95

Logitech 2 Buttons Mouse (High Resolution)	$12
Logictech Mouse Man Serial	$39
Logictech Mouse Man Bus	$55
Logictech Portable Serial Mouse	$45
Real Microsoft Serial Mouse (New Model)	$45
Real Microsoft Bus Mouse	$75

ACCESSORIES



Cpu cooling kit w/ heatsink & fan	$15
Full Version MS-DOS 6.0 (Real Microsoft)	$39.95
Full Version Windows 3.1 (Real Microsoft)	$44.95
ULSI Math Coprocessor 387-40MHz	$65
Panasonic 1123 Printer	$198
Panasonic 2123 Printer	$238
Color Option Kit	$48
Power Center (Surge Protector)	$15.95
Printer Stand	$2.95

Case

Mini Desktop Case + Power Supply 200W	$55
Mini Tower Case + Power Supply 200W	$55
Medium Tower Case + Power Supply 230W	$85
Full Size Tower Case + Power Supply 250W	$98
Black Tower (All Model)	$Call

Tape Backup

Colorado 120Mb Tape Back-up	$145
Colorado 250Mb Tape Back-up	$178

Sound Card

Sound Blaster Deluxe	$78
Sound Blaster Pro Deluxe	$125
Sound Blaster 16	$168
Sound Blaster 16 ASP	$208
Media Vision Spectrum Pro 16 w/ SCSI Interface	$148

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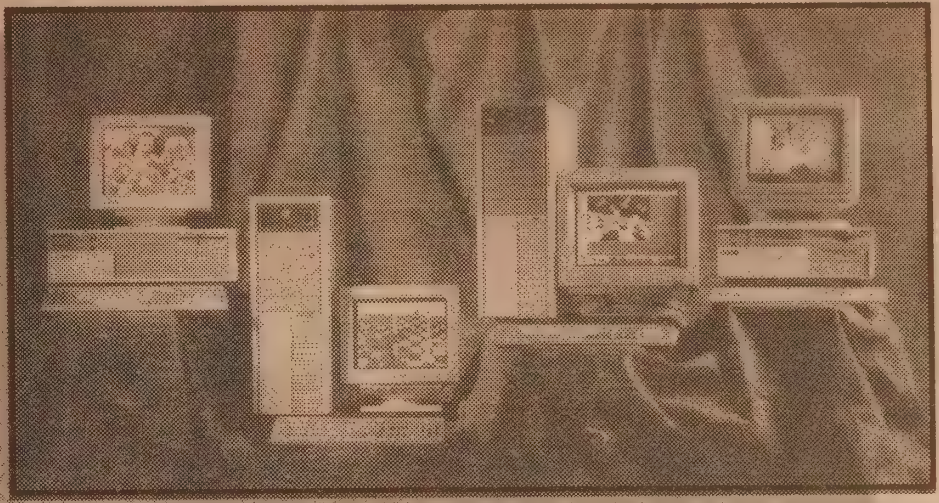

AMI Super Voyager Vesa LB Systems

- ★ **AMI Super Voyager** w/ **Intel CPU**
- ★ **256KB Cache**
- ★ 4Mb Ram installed expandable to 64Mb (70-pin)
- ★ IDE Controller 2HD & 2FD w/ 2s, 1p, 1g Port (High Speed on Serials Port)
- ★ Floppy Drive 1.2Mb & 1.44Mb
- ★ **Hard Disk 213Mb** IDE 14ms (Western Digital Caviar 2200)
- ★ **Orchid Fahrenheit** 1280 VLB w/ 1Mb expandable to 2Mb
- ★ **14" Super VGA Color** Monitor (1024x768) **.28 Non-Interlaced**
- ★ 101 Keys Enhanced Keyboard
- ★ Mini Tower Case w/ 200 Watts Power Supply
- ★ **FREE** Real Microsoft Mouse Serial

486DX2-66	$1848
486DX-50	$1778
486DX2-50	$1728
486DX-33	$1638
486SX-33	$1498
486SX-25	$1438

ORCHID Super Board Vesa LB Systems

- ★ **Orchid SuperBoard** w/ **Intel CPU**
- ★ **256KB Cache**
- ★ 4Mb Ram installed expandable to 32Mb (30-pin)
- ★ IDE Controller 2HD & 2FD w/ 2s, 1p, 1g Port
- ★ Floppy Drive 1.2Mb & 1.44Mb
- ★ **Hard Disk 213Mb** IDE 14ms (Western Digital Caviar 2200)
- ★ **Orchid Fahrenheit** 1280 VLB w/ 1Mb expandable to 2MB
- ★ **14" Super VGA Color** Monitor (1024x768) **.28 Non-Interlaced**
- ★ 101 Keys Enhanced Keyboard
- ★ Mini Tower Case w/ 200 Watts Power Supply
- ★ **FREE** Real Microsoft Mouse Serial

486DX2-66	$1628
486DX-50	$1568
486DX2-50	$1518
486DX-33	$1428
486SX-33	$1298
486SX-25	$1208

PIXEL 486 Series Vesa LB Systems

- ★ Mother-Board w/ CPU
- ★ 128K Cache Expandable to 256Kb
- ★ 4Mb Ram installed expandable to 32Mb
- ★ IDE Controller 2HD & 2FD w/ 2s, 1p, 1g Port
- ★ Floppy Drive 1.2Mb & 1.44Mb
- ★ Hard Disk 130Mb IDE 15ms (Maxtor 7131A)
- ★ Windows Accelerator VLB w/ 1MB (32-bit)
- ★ 14" Super VGA Color Monitor (1024x768)
- ★ 101 Keys Enhanced Keyboard
- ★ Mini Tower Case w/ 200 Watts Power Supply
- ★ **FREE** Real Microsoft Mouse Serial

Intel 486DX2-66	$1438
Intel 486DX-50	$1373
Intel 486DX-33	$1233
Cyrix 486DLC33	$1018
Intel 486SX-25	$1018
AMD 386DX-40	$988

PIXEL 486 & 386 ISA Bus Systems

- ★ MotherBoard w/ CPU
- ★ 128K Cache Expandable to 256Kb
- ★ 4Mb Ram installed expandable to 32Mb
- ★ IDE Controller 2HD & 2FD w/ 2s, 1p, 1g Port
- ★ Floppy Drive 1.2Mb & 1.44Mb
- ★ Hard Disk 130Mb IDE 15ms (Maxtor 7131A)
- ★ Trident 9000 Super VGA Card 512KB (16-bit)
- ★ 14" Super VGA Color Monitor (1024x768)
- ★ 101 Keys Enhanced Keyboard
- ★ Mini Tower Case w/ 200 Watts Power Supply
- ★ **FREE** Real Microsoft Mouse Serial

Intel 486DX2-66	$1388
Intel 486DX-50	$1318
Intel 486DX-33	$1178
Cyrix 486DLC33	$938
Intel 486SX-25	$968
AMD 386DX-40	$908

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- *Three 386DX/40 Workstations*
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Three 386DX/40MHz workstations configured as follows:

- 386DX/40MHz 64K Cache
- 4MB RAM exp. to 32MB
- 80MB Hard Drive 17ms
- 1.2 or 1.44MB Floppy Drives
- 14" SVGA Color Monitor .39dp
- SVGA Video Card 512K RAM
- Mini-Tower Case 200W PS
- 101 Enhanced Keyboard
- 2HD/2FD Controller
- Logitech Mouse

One 486DX/33MHz workstations configured as follows:

- Intel 486DX/33MHz 64K Cache
- 8MB RAM exp. to 32MB
- 130MB Hard Drive 15ms
- 1.2 and 1.44MB Floppy Drives
- 14" SVGA Color Monitor .28dp
- SVGA Video Card 1MB RAM
- Mini-Tower Case 200W PS
- 101 Enhanced Keyboard
- 2HD/2FD Controller
- Logitech Mouse
- 120MB Colorado Tape Back-up
- 96/24 Internal Fax/Modem
- Mitsumi CD-ROM Drive 350ms

Each Station Comes With:

- MS DOS 6.0 w/Manuals
- MS Windows 3.1 w/Manuals
- MS Windows for WorkGroups 3.1
- MS-Mail and MS-Schedule+
- Intel EtherExpress 16-bit LAN Card
- Diskettes, Cables and Manuals

NOWNet I $5799*

NowNet Package II

The Performance Pack

- *Three 486DX/33MHz Workstations*
- *One 486DX2/66MHz Loaded Station*

Three 486DX/33MHz workstations configured as follows:

- 486DX/33MHz 256K Cache
- 8MB RAM exp. to 32MB
- 210MB Hard Drive 14ms
- 1.2 and 1.44MB Floppy Drives
- 14" SVGA Color Monitor .28dp NI
- Local Bus Video Card 1MB RAM
- Mini-Tower Case 200W PS
- 101 Enhanced Keyboard
- 2HD/2FD IDE Controller
- Logitech Mouse

One 486DX2/66MHz workstations configured as follows:

- Intel 486DX2/66MHz 256K Cache
- 16MB RAM exp. to 32MB
- 340MB Hard Drive 15ms
- 1.2 and 1.44MB Floppy Drives
- 15" ADI 4G Monitor .28dp NI Flat
- Stealth 24 VLB1MB Video Card
- Full-Tower Case 250W PS
- 101 Enhanced Keyboard
- Logitech Mouse
- Local Bus VLB 2HD/2FD Controller
- 250MB Colorado Tape Back-up
- 14.4/14.4 Internal Fax/Modem
- Toshiba 3401B CD-ROM 200ms
- Pentium OverDrive ZIF Socket

Each Station comes with:

- MS DOS 6.0 w/Manuals
- MS Windows 3.1 w/Manuals
- MS Windows for WorkGroups 3.1
- MS-Mail and MS-Schedule+
- Intel EtherExpress 16-bit LAN Card
- Diskettes, Cables and Manuals

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- Intel i80486DX/33Mhz
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- 170MB IDE Hard Drive 13ms
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- 14" SVGA .28dp Monitor
- Local Bus SVGA Card 1MB
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- 101 Enhanced Keyboard
- Logitech Mouse
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Local Bus - MultiMedia

Pentium OverDrive Ready

PowerMedia

- Intel i80486DX2/66Mhz
- 8MB RAM, 256K Cache
- 340MB IDE Hard Drive 13ms
- 1.2 and 1.44MB Floppy Drives
- 15" ADI 4G .28dp Flat Monitor
- Stealth 24 VLB Card 1MB
- Local Bus IDE Controller
- Medium-tower Case 230W PS
- 101 Enhanced Keyboard
- Logitech Mouse
- Sound Blaster 16 ASP Card
- Toshiba 3401B 200ms CD-ROM
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- Dynamic Microphone
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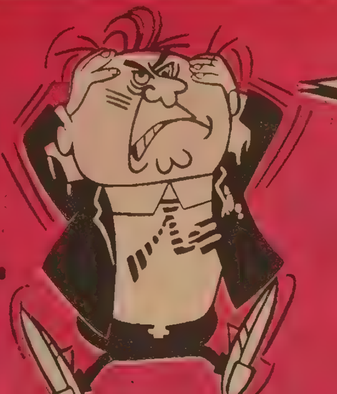
Are You Suffering From Computer Anxiety?



- Should I buy ISA, EISA or VESA?
- Which is better... IDE, SCSI or an ESDI Hard Drive?
- Has the true 50 MHz VESA Local Bus been standardized yet? Is it safe to buy?
- What the heck is "Bus Mastering"? Does my system support it?
- Do all hard drives support the Local Bus?
- Is the P24T OverDrive the same as the Pentium?

WHO CAN HELP ???

Call NOW before you get to an advanced stage where there is no going back.

DID YOU KNOW THAT...

- VESA (VL-BUS) is faster than ISA or EISA.
- True 50Mhz on VESA is NOT recommended.
- A buffered VESA slot will prevent CPU from overloading and guarantees reliable operation.
- A system can not be called "Local Bus" unless the video card and/or the HD controller are inserted on a local bus slot with 32-bit interface.

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A well built system for those who are seeking brand-name quality components and the latest in technology at a low price. Ideal for home use, office work and Multimedia.

Micronics or AMI SuperVoyager
ISA and VL-BUS
Intel 66MHz 486DX2 CPU

American Megatrends

- 66MHz Intel 486DX2 CPU
- 256KB Fast Static Cache
- 8MB RAM exp. to 64MB
- 245MB Quantum ProDrive 256K Cache 11ms
- 32-bit Local Bus IDE Interface
- 32-bit ATI Ultra Pro VLB 1MB VRAM
- NEC 3FGXe 15" (or MAG 15" MX15F) Monitor
- 1.2 and 1.44 High Density Floppy Drives
- Full-Tower Case 250W PS Dual Fans
- 101 Keytronic Keyboard
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- Pentium OverDrive ZIF Socket
- CPU Heat Sink and Fan

Pentium OverDrive Ready

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If you are looking for reliability, speed and performance, then you are in with a Warrior. Built to meet the needs of CAD designers, Software developers and Desktop Publishers.

Micronics or AMI Enterprise III
EISA • VL-BUS • SCSI-2
Intel 66MHz 486DX2 CPU

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- 66MHz Intel 486DX2 CPU
- 256KB Fast Static Cache
- 16MB RAM up to 256MB (on AMI)
- 880MB Toshiba SCSI-2 512K Cache 12ms Hard Drive
- 32-bit Ultrastor 34F VLB SCSI-2 Controller
- 32-bit Diamond Viper VLB 2MB VRAM Video Card
- NEC 3FGX 15" (or MAG 15" MX15F) Monitor
- TEAC Combo 1.2 and 1.44 Floppy Drive
- Full-Tower Case 300W PS Dual Fans
- 101 Keytronic Keyboard
- 2 VL-Bus and 6-EISA Slots
- Pentium OverDrive ZIF Socket
- CPU Heat Sink and Fan

Pentium OverDrive Ready

$4395

Crusader

The Crusader combines the latest and greatest of every component in the industry. It's ideal for high-end Multi-Media, File Server, Windows NT and Photographers/Artists workstation

AMI Enterprise III
EISA • VL-BUS • SCSI-2
FastSCSI-FastLAN VLB
Intel 66MHz 486DX2 CPU

Pentium OverDrive Ready

American Megatrends

$5595

- AMI Enterprise III EISA-VESA Board
- 66MHz Intel 486DX2 CPU
- 256KB Fast Static Cache
- 16MB RAM up to 256MB
- Maxtor MXT-540SL SCSI-2 8.5ms Hard Drive
- 32-bit AMI FastSCSI and SCSI-2 VLB Controller
- 32-bit AMI FastLan VLB Network Card
- 32-bit AMI FastView VLB 2MB VRAM P9000
- Nanoa F340iW 15" Flat Monitor MRP-II
- TEAC 1.2MB and 2.88MB Floppy Drives
- Toshiba 3401B 200ms 330KB/s CD-ROM Drive
- Creative Labs Sound Blaster 16ASP
- Full-Tower Case with 300W PS Dual Fans
- 129 Keys Focus 9000 programmable Keyboard
- Labtec 550 Amplified Speakers
- MicroSoft Mouse 2.0
- 5 CD's Bundle

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ORCHID Genoa SYSTEMS CORPORATION DIAMOND ASUS

- VESA Local Bus Motherboard
- 66MHz Intel 486DX2 CPU
- 256K 20ns Cache
- 8MB RAM up to 64MB
- 250MB Western Digital Hard Drive 13ms
- 1.2 and 1.44MB TEAC Floppy Drives
- 15" ADI 4G .28dp NI Flat Monitor
- 32-bit Stealth 24 VLB 1MB VRAM or Orchid Fah. 1280 VLB 1MB
- 32-bit IDE VLB Controller
- Medium Tower Case 230W PS
- 101 Keytronic Keyboard
- 2 Ser, 1 Par and 1 Game Ports
- Built-in Math Co-processor
- CPU Heat Sink and Fan

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Diamond FastBus VLB	**$2195**
ORCHID Superboard VLB	**$2150**
ASUS Pentium Ready	**$2095**
Genoa TurboExpress VLB	**$2075**

ORCHID Genoa SYSTEMS CORPORATION DIAMOND ASUS

- VESA Local Bus Motherboard
- 33MHz Intel 486DX CPU
- 64K 20ns Cache
- 4MB RAM up to 64MB
- 170MB Western Digital HD 12ms
- 1.2 and 1.44MB TEAC Floppy Drives
- 14" AcerView 34T .28dp NI Monitor
- 32-bit Genoa 8500 VLB or ET4000 VLBController
- 32-bit IDE VLB Controller
- Mini Tower Case 200W PS
- 101 Enhanced Keyboard
- 2 Ser, 1 Par and 1 Game Ports
- Built-in Math Co-processor

MOTHERBOARD OPTIONS:

Diamond FastBus VLB	**$1495**
ORCHID Superboard VLB	**$1450**
ASUS Pentium Ready	**$1395**
Genoa 486DX2/66MHz VLB	**$1375**

Intel 486DX2/66MHz CPU	**$1495**
Intel 486DX/50MHz CPU	**$1395**
Intel 486DX2/50MHz CPU	**$1330**
Intel 486DX/33MHz CPU	**$1175**

- ISA Motherboard and Intel CPU
- 64K 20ns Cache
- 4MB RAM up to 32MB
- 130MB Maxtor IDE HD 15ms
- 1.2 and 1.44MB TEAC Floppy Drives
- 14" SVGA .28dp Monitor
- SVGA 1MB RAM Video Card
- Mini Tower Case 200W PS
- 101 Enhanced Keyboard
- 2HD/2FD IDE Controller
- 2 Ser, 1 Par and 1 Game Ports
- Built-in Math Co-processor

UPGRADES:
Add $25 for 256K Cache
Add $120 for 8MB RAM
Add $50 for 210MB HD
Add $45 for NI Monitor

Intel 486SX/33MHz CPU	**$949**
Intel 486SX/25MHz CPU	**$879**
Cyrix 486DLC/40MHz CPU	**$899**
Cyrix 486DLC/33MHz CPU	**$849**
AMD 386DX/40MHz CPU	**$779**
Intel 386DX/33MHz CPU	**$779**

- ISA Motherboard and CPU
- 64K Fast Cache
- 4MB RAM up to 32MB
- 80MB IDE HD 17ms
- 1.2 or 1.44MB TEAC Floppy Drives
- 14" SVGA Color Monitor
- SVGA 512KB RAM Video Card
- Mini Tower Case 200W PS
- 101 Enhanced Keyboard
- 2HD/2FD IDE Controller
- 2 Ser, 1 Par and 1 Game Ports

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Add $20 for 1MB Video

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210MB	Please Call
250MB	Please Call
340MB	Please Call
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535MB Plus	Please Call

Monitor/Video

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96/24 Fax/Modem	Please Call
96/96 Fax/Modem	Please Call
14.4/14.4 Fax Modem	Please Call
Intel Satisfaction 400	Please Call
National Fax/Modem/ Voice/ Mail	Please Call

Storage Devices

120/250MB Tape Back-up	Please Call
120/250MB Tracker Parallel	Please Call
21MB Floptical Drive w/Kit	Call
2.88MB Floppy Drive	Please Call

Internal CD-ROM

Mitsumi 350ms w/Card	Call
SONY 31A 490ms w/Card	Call
SONY 541 380ms w/Card	Call
Texel 3024 265ms	Please Call
NEC CDR-84 280ms	Please Call
Toshiba XM-3401B 200ms	Call

MultiMedia

MediaVision Fusion CD 16 Kit	Call
Creative Labs Upgrade Kit	Call
Pro AudioSpectrum 16bit	Call
Sound Blaster Pro Basic	Call
Sound Blaster Pro 16bit	Call
Video Blaster (TV in PC)	Call

Pointing Devices

3-button Mouse	Please Call
Logitech 1st Mouse	Please Call
Logitech Mouseman	Please Call
Logitech Trackman	Please Call
SummaSketch III 4 Button	Call
MS DOS 5.0	Please Call
Windows 3.1	Please Call

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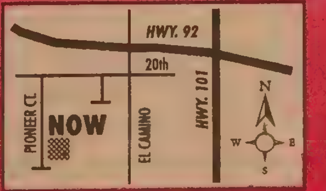

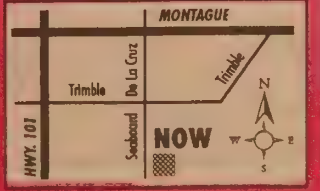

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continued from page 38

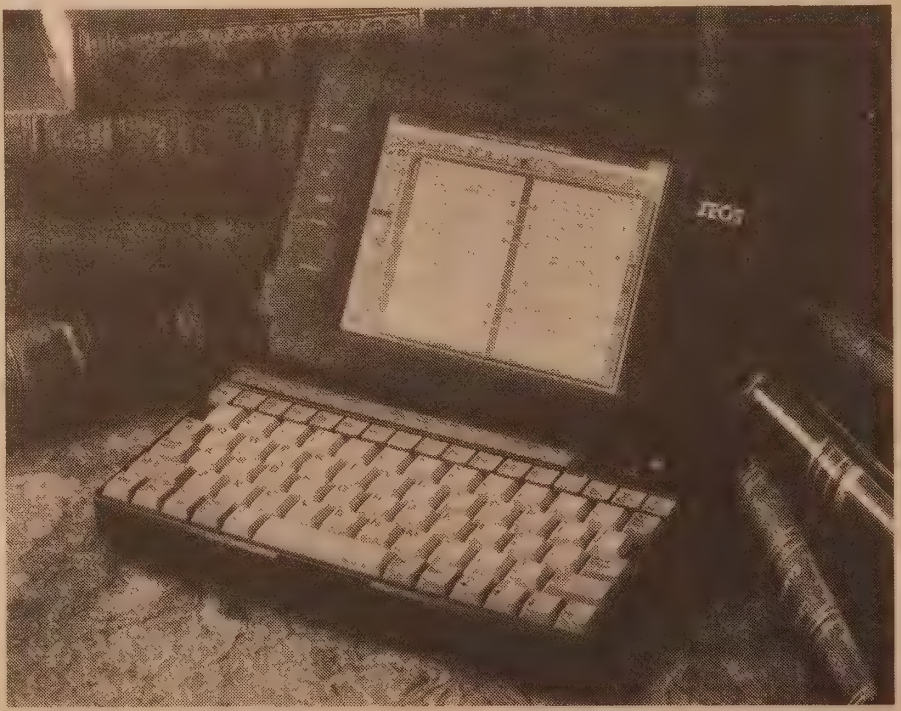
Computer of the Month:

Zeos Contenda Subnotebook

As miniaturization becomes more sophisticated, the portable buyer is presented with more and more options. Portables led to laptops. Laptops led to notebook computers, and in the last year notebooks have been joined by subnotebooks as alternative On-The-Go computers.

While the first subnotebooks were convenient, they did not have either the power or display capability of the slightly larger notebook units.

Zeos has made both of those objections obsolete with the release of the Contenda. Two models, which look exactly the same, are available. The newer model sports a 486SL central processor, while the original Contenda is powered by a 386SL. The 486 model has a number of advantages: 3.3 volt technology offering a longer battery life and 512K video RAM, compared to 256K in the slower machine. Starting price for the 486 version is $1,795—$400 more than the slower machine. Both machines run at 25MHz.



One other difference is that the 386 comes with two megabytes of RAM, compared to four megabytes in the more expensive machine. In either case, RAM is expandable to eight megabytes ($198) for the faster machine and either four megabytes ($99) or ten megabytes ($660) for the 386 unit.

The display on these computers measures 7.4" diagonally and offers a VGA display. If you decide to use this as a desktop machine, you can attach either a VGA or super VGA color monitor. Zeos allows you to use either display or both the built-in LCD and the external color monitor. Another interesting feature of this unit is that you can set it up with different fonts to accommodate the different ratios on the two displays. This makes for a much more pleasing look.

The overall dimensions of the computer are 9.7" x 6.1" x 1.8." The Contenda weighs a modest 3.9lbs. In order to cut down on size, Zeos has packaged the 3.5" floppy drive ($99) as a separate unit which easily attaches to the computer. A 5.25" floppy drive ($279) is also available, but you cannot use both drives at the same time. The Contenda comes with an 80MB hard drive, which, unfortunately, is the only size available. With DOS 6.0, however, you can nearly double this capacity.

The keyboard is necessarily small, but as good as you can get in this space. I had no problem typing on it, but working all day would be a strain. If you seriously consider using this as your only computer, you should consider getting the accessory keyboard ($129) that connects through the parallel port. Unfortunately, you are limited to this type of keyboard, as a standard PS/2 keyboard port is not provided.

Power management on this machine is terrific. The setup screen gives you lots of options, and the documentation discusses ways in which you can conserve battery power. With all of the power conservation options in place, you can get up to four hours of use from a single battery charge. If you need more time, additional Nickel Metal Hydride batteries ($99) are available. By using indicated keys, you can put the Contenda into a standby mode, which puts everything to sleep, ready to reawaken at the touch of a key. A more extreme power conservation option is suspend, also invoked with the touch of a key, which saves the screen to disk and turns the unit off. When you start up again, however, you will be right where you left off, in the middle of a document within an application.

Zeos has a number of different packages available with different options. The prices vary from $1,395 all the way up to $2,395 for the 486 with full memory, 3.5" floppy drive, carrying case, extra battery, internal fax/modem, MS-DOS 6.0, Windows3.1 and Lotus Organizer.

If you are on the road a lot, this is a wonderful computer to consider. It really has all the power and all the features. You also get Zeos' wonderful service, available 24 hours a day! ■

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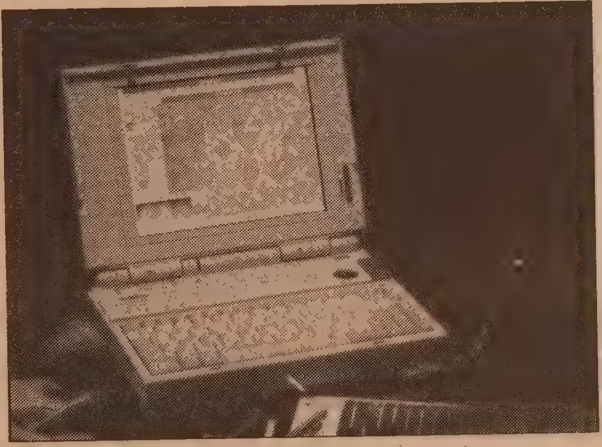

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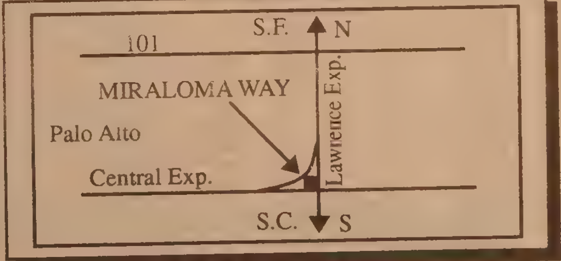

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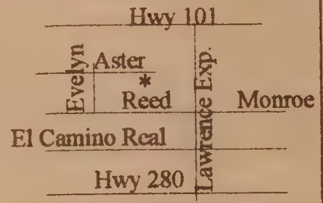

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continued from page 70

talization. Brown 'n Brawny, which is already engaged in the business of producing robotic teddy bears, incurs software development costs for their new Pink Grizzly line. In that case, the cost of developing the new software might have to be included in the cost of the Pink bear inventory. Therefore, the deduction for such costs would be deferred until the year in which the Pink bears are sold. However, if the programming costs qualify as R&D expenditures, the company may receive a current tax write-off, even if the new bears sit in the warehouse for years to come.

CREDIT FOR INCREASING RESEARCH ACTIVITIES

Identification of qualified R&D expenditures is also important in order to claim a credit for increased research expenditures. Research costs eligible for this credit are limited to research of a technological nature that is aimed at developing a new or improved business component. The research must have a pragmatic or "functional" purpose.

The new or improved business component may be any computer software. However, there are special requirements for software developed by a company for its own in-house use.

Internal use software must be innovative; the key for innovation here being that its development must involve significant economic risk to the taxpayer—not just a remake, even a substantial remake of another software package already on the market. There must be a substantial commitment of resources and technological uncertainty in order to qualify for the credit.

PROPOSED REGULATIONS NOT CARVED IN STONE

What has been discussed throughout this article is one set of IRS proposed regulations replacing another set. This means that the IRS is changing the way in which the taxpayer should expect the Service to interpret existing law. The regulations used prior to these new ones were also proposed, and never finalized; yet they had been used since 1989 as guidance by the IRS. In short, these interpretations can and likely will undergo further change without Congress ever passing a law.

The citation to which all this hoopla refers is "Research and Experimental Expenditures," Proposed Treasury Regulation Section 1.174-2 (3/24/93), Fed. Reg. Vol. 58, No. 55, p. 15819. Please feel free to call my office for a copy. ■

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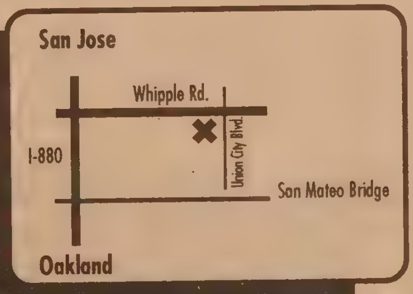

The value of PC MSA to your business comes from your ability to become more effective and efficient in dealing with your present customers, and in finding new ones.

continued from page 92

both the software and hardware as well as determining what data you need to collect about your customers, what reports are needed by your sales force, sales management, marketing management, and general management. The consultant you select should be able to tailor the system to your specific requirements so that when your salespeople first start to use it, it is set up for their needs (which greatly improves their willingness to use the system). It is also important to be able to smoothly transfer customer data between the various parts of your companies computer systems—such as accounts receivable—and import it into your PC MSA system. The other key activity a consultant can provide is training for your sales and management staff, helping them understand what you want to accomplish, and how to use the system to meet these goals.

Since the key to success is the effective business use of PC MSA, your consultant must have marketing and sales expertise, along with solid technical knowledge. We've found consultants in this area who have backgrounds that range from being network VARs who offer contact management software, word processing trainers who are branching out into a new area of business, database programmers, or accounting software consultants. Be careful who you choose—make sure they have real skill in how to use PC MSA to improve your business. It is often worthwhile to have the consultant both sell you and install the software. This gives you a single person or company to turn to when you have problems or questions, or want more training.

HOW DO YOU START?

The first part of getting started is what you are doing by reading this article, getting yourself educated. Then, since this is a business decision, you need to think about what you could save if you invested in PC MSA, and what you risk if you do not. After this, you must select software, tailor the software for your company, install it, transfer any existing data, train your sales force—and sales management, then start a new way of doing business.

There are several sources for help and information. One is the Sales Automation Association. You may also be able to get help from the software vendors, or their local representatives—but be cautious, because they will be selling their own "solution." In addition, there are independent consulting companies that specialize in this business, such as the Denali Group, in Issaquah,

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486SX-25 INTEL	99
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386DX-33 INTEL	64
386DX-40 AMD	69
386DX-25 INTEL	35
386DX-25 AMD	33
386SX-25 INTEL/AMD	30
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Toshiba 3401B Int (200ms, 330KB)	$469
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Item	Price
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DeskJet 1200C	$1395	PaintJet	$695
LaserJet IIIp	$855	PaintJetXL	$1645
LaserJet 4	$1335	PaintJetXL300	$2165
LaserJet 4M	$1855	PaintJetXL300/PS	$3165

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Item	Price
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LX-810, 9-pin, narrow	$169
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FX1170,24-pin, wide	$359
LQ-570, 24-pin, narrow	$239
LQ-870, 24-pin, narrow	$469
LQ-1070, 24-pin, wide	$359
LQ-1170, 24-pin, wide	$599
AP-1000, 300dpi, 6ppm	$639
EPL-8000, 300dpi, 10ppm	$899

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KX-P1124i	$279	KX-P4410	$599
KX-P2023	$189	KX-P4430	$699
KX-P2123	$235	KX-P4450i	$999
KX-P2124	$315	KX-P4455	$1665
KX-P2180	$165	KX-PCK11	$45
KX-P1624	$345	KX-PT12	$50
KX-P2624	$369	KX-P37	$95

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*386SX- 33 CPU	*386DX-33/40 CPU	*Intel 486SX-25 CPU	*Intel 486DX-33CPU	*Intel 486DX-50 CPU	*Intel 486DX2-66 CPU
*1-16MB RAM (70ns)	*1-32MB RAM (70ns)	*1-128MB RAM (70ns)	*1-128MB RAM (70ns)	*1-128MB RAM (70ns)	*1-128MB RAM (70ns)
*AMI BIOS	*128K CACHE	*128K CACHE	*256K CACHE	*256K CACHE	*256K CACHE
*Teac 1.2 or 1.44 FDD	*AMI BIOS	*AMI BIOS	*AMI BIOS	*AMI BIOS	*AMI BIOS
*IDE FD/HD CTL	*Teac 1.2 or 1.44 FDD	*Teac 1.2 or 1.44 FDD	*Teac 1.2 or 1.44 FDD	*Teac 1.2 or 1.44 FDD	*Teac 1.2 or 1.44 FDD
*2S\1P\1G ports	*IDE FD/HD CTL	*IDE FD/HD CTL	*IDE FD/HD CTL	*IDE FD/HD CTL	*IDE FD/HD CTL
*101-key keyboard	*2S\1P\1G ports	*2S\1P\1G ports	*2S\1P\1G ports	*2S\1P\1G ports	*2S\1P\1G ports
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		Orchid Fahrenheit 24X 1MB	$149
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Trident 1024 W/1MB	$65	OrchidP9000 VLB	$359
Tseng Labs 1024 1MB	$85	Diamond Stealth 24 1MB	$179
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Conner 80MB IDE	$169	Maxtor 345MB IDE	$349
Conner 120MB IDE	$189	Maxtor 345MB SCSI	$439
Conner 170MB IDE	$209	Maxtor 540MB IDE	$859
Conner 254MB IDE	$269	Maxtor 540MB SCSI	$899
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HP ScanJet IIc w/IF	$1359
Microtek IIXE	$1129
Logitech Scanman32	$129
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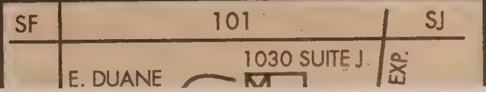

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Washington, and The OMT Group, in Santa Clara, California.

SOFTWARE PACKAGES TO CONSIDER

I have tested or used over fifty packages, and here are a few to consider—with good functionality and companies that stand behind them. You will need to choose only one. If you have a consultant, make sure they are part of this process, and try calling the companies to ask for demo copies of the software.

- ACT! This the best known package, with versions available for both DOS and Windows (though the Windows network version is not yet available). ACT! is a good package for a one-person sales effort or office, but has limits on how well it performs some of the sales management and marketing functions. The biggest weakness of ACT! is its inability to handle forecasts and sales data. A good program for a small office.
- **Goldmine** This package was designed for networks from the very beginning, so groupware capabilities like scheduling follow-up for other people are easy with Goldmine. A full-featured, flexible, easy to use, and very cost competitive product. No major weaknesses. Presently available only in DOS. Windows version is due later this year.
- **Maximizer for Windows** One of the first low-cost network and Windows-compatible contact management systems. A good value, fairly easy to use, has some limits using it as a sales management tool due to limited forecasting capabilities. A DOS version is also available.
- **Nurture** Nurture has one special feature that makes it worth consideration: the ability to put prospects into different predefined sales plans. These sales plans define a plan of contact, and built-in tools show the effectiveness of various contact plans. However, this package can be somewhat difficult to use. Also only available as a DOS program, it will operate as a DOS session under Windows.
- **Telemagic** Telemagic V12 is one of the best known packages. Telemagic has a long list of add-on products—270—available to solve various MSA problems not handled by the main package. Telemagic has some limitations that are serious, however, in its ability to be used as a sales management tool. Telemagic has add-ons for particular business types, so perhaps Telemagic can offer a turnkey version well suited to your particular business. If so, you will need less outside support. Currently available in DOS.

TAKING THE STEP FORWARD

PC MSA offers too much to ignore. A well-thought-out and implemented system can improve your bottom line, as well as increase your ability to serve your present customers and develop new ones. If you want these benefits you need to start educating yourself. A good way to start your self-education is by contacting the Sales Automation Association, independent marketing/sales automation consultants, the software suppliers, and local user groups. ■

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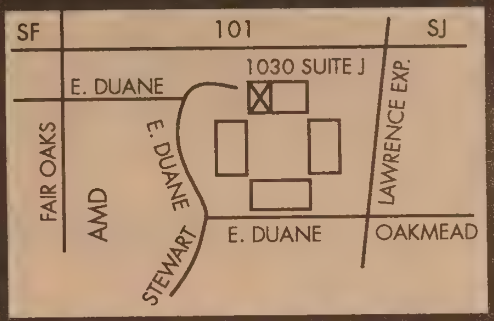

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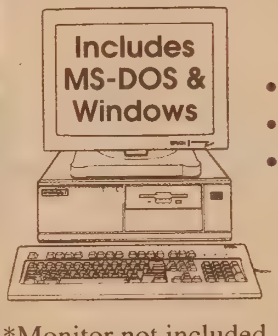

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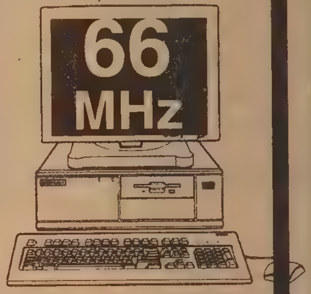

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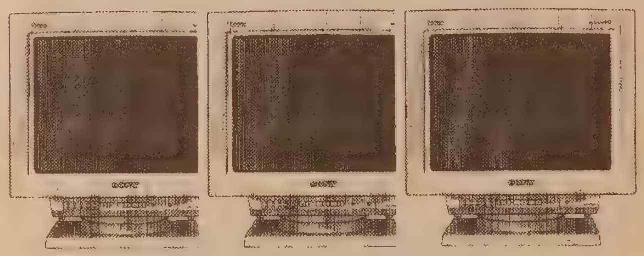

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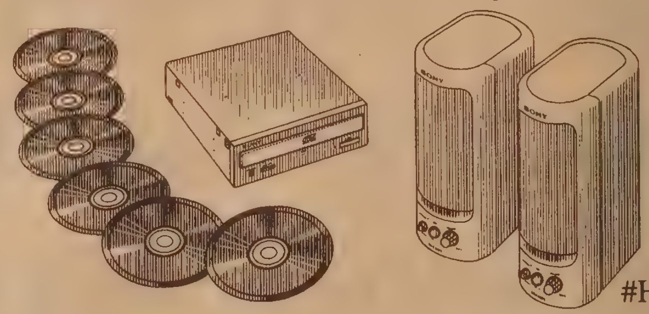

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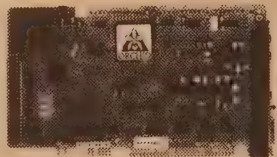

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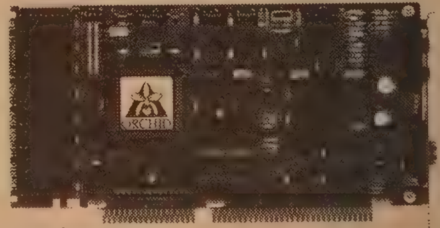

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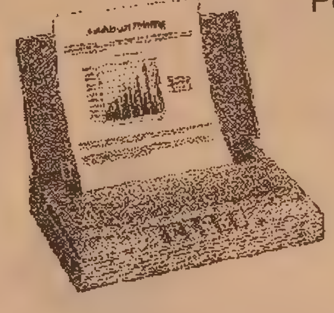

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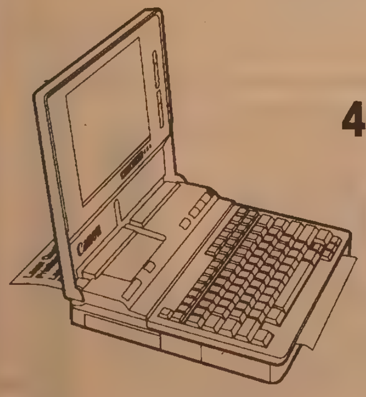

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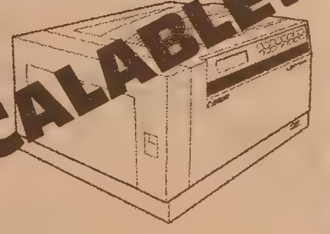

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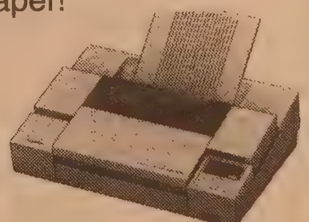

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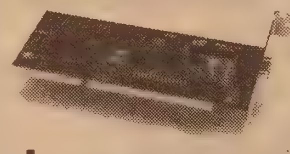

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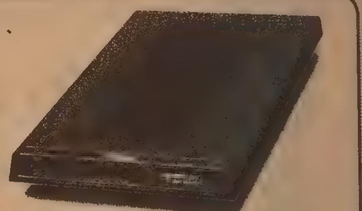

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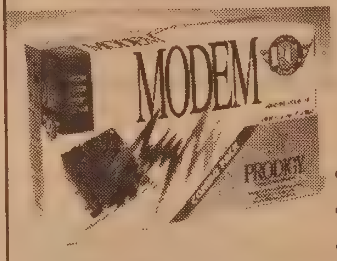

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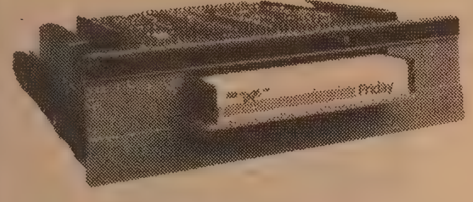

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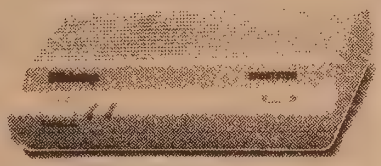

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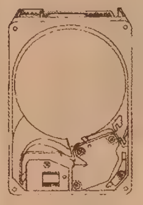

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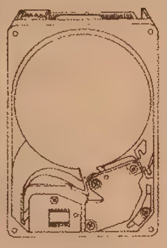

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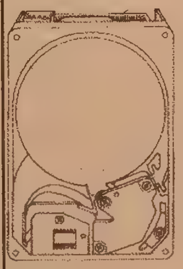

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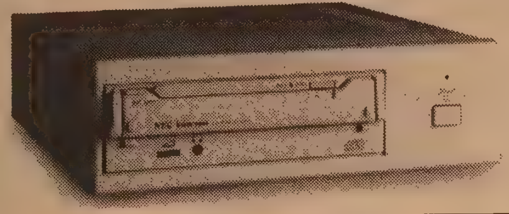

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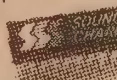

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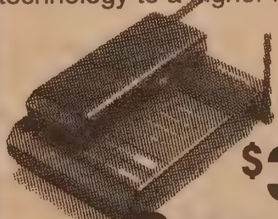

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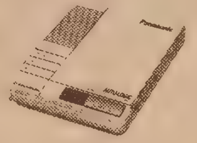

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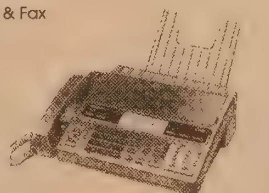

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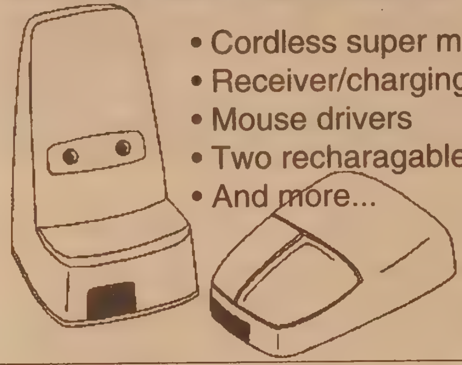

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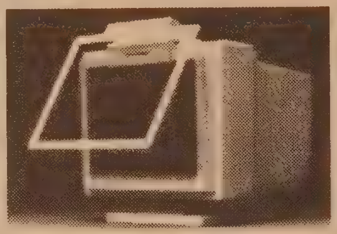

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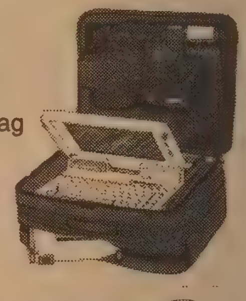

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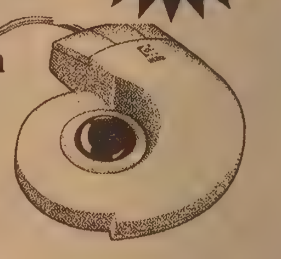

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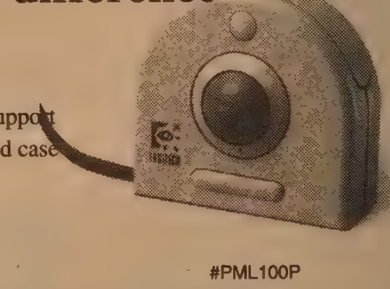

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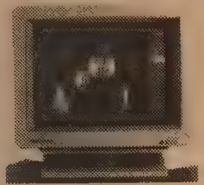

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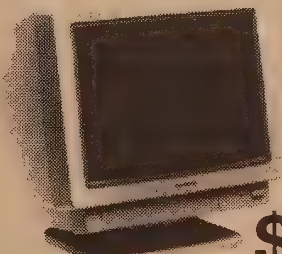

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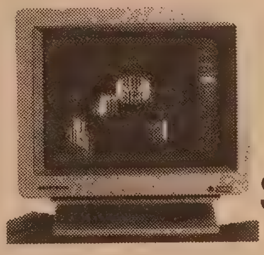

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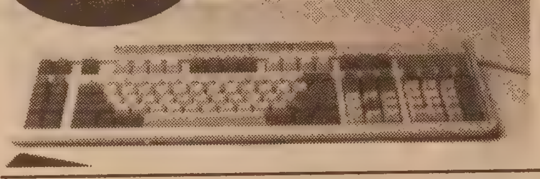

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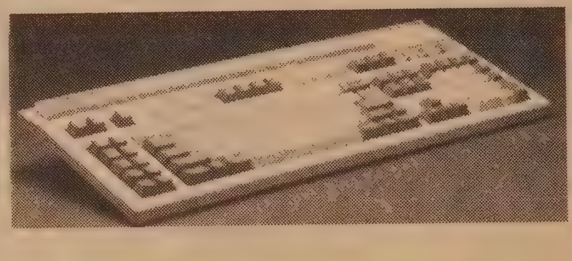

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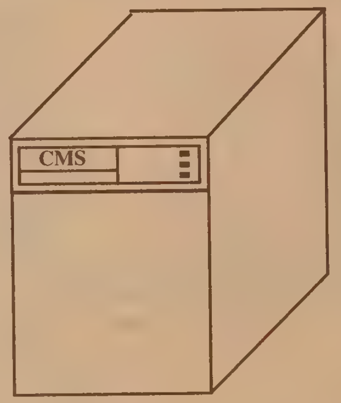

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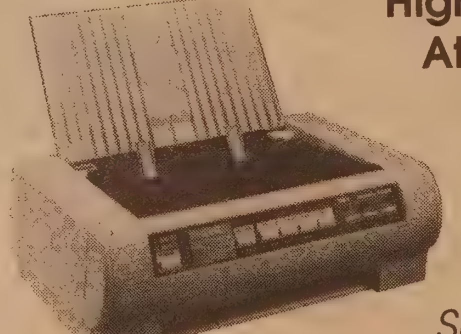

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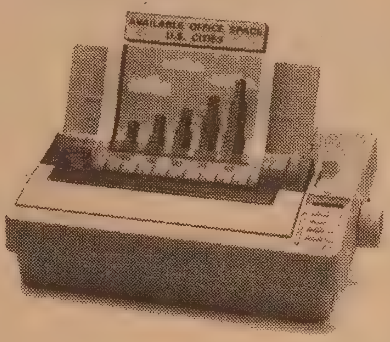

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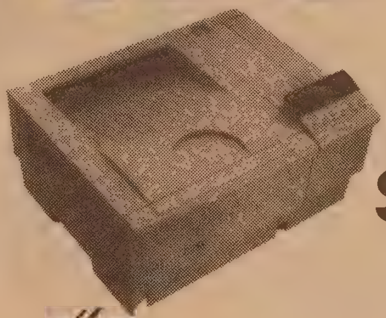

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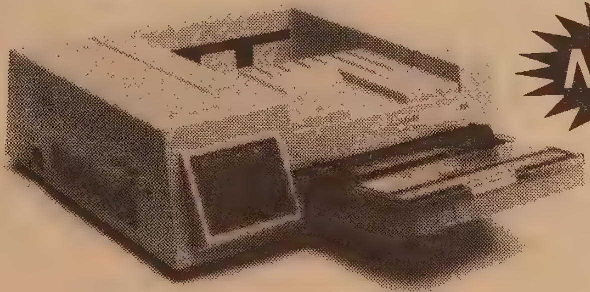

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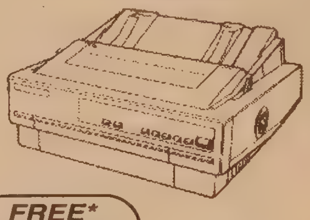

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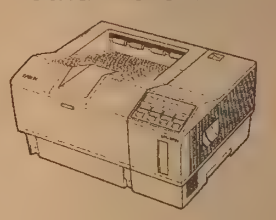

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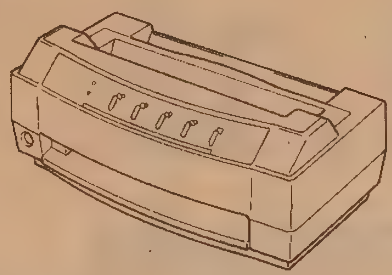

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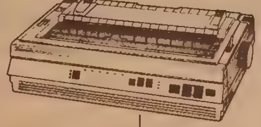

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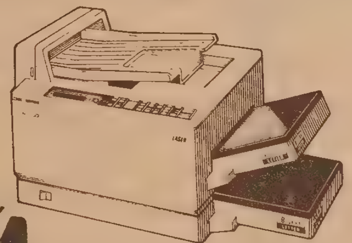

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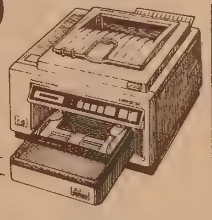

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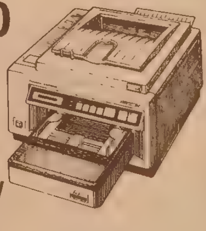

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OS/2 2.1:
The Installation
Software Choices And Other Considerations

BY FABIAN PASCAL

Last month I discussed the hard disk considerations for OS/2 and, to recall, I opted for the following:

Disk 1:
- C: DOS 5.0 Primary Partition, 60MB
- D: OS/2 2.0 Extended Partition, FAT, 150MB

Disk 2:
- E: OS/2 2.1 Extended Partition, FAT, 45MB (for the operating system)
- F: OS/2 2.1 Extended Partition, FAT, 100MB (for utilities and small apps)
- G: OS/2 2.1 Extended Partition, HPFS,100MB (for DBMSes and larger apps)

I was now ready to install 2.1.

OS/2 2.1 comes on either diskettes or CD-ROM. For those who have a CD-ROM drive installation is more convenient—no 17+ driver disks to swap—and faster. However, I installed from 3.5" disks.

Unlike its previous version, which came with practically no documentation (which, for a product of its nature and sophistication, is inconceivable), 2.1 comes with two manuals—somewhat better, but still not up to the task. The justification is that there is considerable documentation online, but I don't accept it. First, the online hypertext concept fragments information into small units which tends to get you into neverending navigation, or even gets circular. Second, online documentation is not a substitute for well-structured manuals.

I'm afraid, however, that this is not a problem unique to OS/2: as software becomes more "GUI" and "object oriented," less and less hardcopy documentation will be provided by vendors. There are several reasons for this, but the point is that it's going to make things increasingly difficult for users.

Be that as it may, you should read the installation manual, as well as the READ.ME file on one of the disks, which has comments for specific hardware and software you might have. You should, however, exercise care with some of the information. For example, there are instructions to deactivate the fast CPU speed, shadowing, and external cache (if any) of your system, otherwise OS/2 may not install. But when I followed these instructions, OS/2 installation failed with an error message that is unintelligible to the average user. When I reactivated the above features, the installation worked! Nevertheless, some other users on CompuServe did say that with those features on they really could not install OS/2. So do it only if it does not work otherwise.

INSTALLATION

The upgrade version of OS/2 2.1 installs *over* DOS or earlier versions of OS/2, which means that unless there are other reasons for it, you don't have to reformat the hard disk. However, if you do format the partition—either prior to or during installation—you may find that later on the installation facility does not recognize the mouse. Should this become a problem in the second stage of the installation, the solution is given below.

With these caveats—and, judging from CompuServe messages, there are many others, depending on specific hardware and software configurations—let's install OS/2.

The first stage of the installation involves the Installation diskette, and diskettes 1–5. Disk 1 prompts you to accept a default drive for OS/2, or to specify another. If the default does not fit your intention, choose the second option, in which case the installation program invokes the FDISK program, which provides a menu-driven capability to manipulate hard disk partitions.

As I recommend preserving a bootable DOS partition, you should also opt for the Boot Manager facility. It allows you to select the operating system each time the system boots. FDISK allows you to add operating systems to the Boot Manager menu displayed at boot time. For example, I have DOS, OS/2 2.0, and OS/2 2.1 on the Boot Manager menu.

There are several types of partitions (bootable, startable, installable) which can lead to confusion. To install OS/2 you must use one of the FDISK menu options to make one partition of at least 20MB *installable*, then exit by saving all your FDISK choices. The install program will again prompt you to accept the installable partition, and now you can do so. After it asks you whether you want to format the partition (if you say yes, it will format it for you), it then begins copying system files to it starting with disk 2, allowing you to watch the progress of the installation on the screen.

File transfers continue through disk 5, at which point you're asked to reinsert the installation and first disk. This ends the first stage of the installation, during which enough files are copied to your hard disk to let OS/2 boot and allow the second stage of the installation to continue from there. The second stage involves the selection of OS/2 desired features to install, which will have to be extracted from the remaining 6–17 and printer and display driver disks.

OS/2 offers you three installation options: all features (28MB), preselected features (20MB), and freedom to choose specific features (8–28MB). The choice of features is an individual matter. I can only describe and justify my choices, but you must consider your needs very carefully. I would suggest installing only those features

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Fabian Pascal is a Palo Alto independent consultant, teacher, and writer specializing in relational database management, OS/2, and office and portable computing. An industry analyst, he teaches seminars, consults, and has published extensively. His second book, Understanding Relational Databases, is forthcoming from John Wiley. He can be reached on MCI Mail (FPascal), CompuServe (73677,3306), and at (415)325-0646 (fax/voice).

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- Keytronic 101 keyboard
- MS DOS 6.0

486DX System

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- 486DX 256K MB
- 4MB RAM
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- 120MB Hard Disk
- 16bit SVGA w/1MB
- SVGAMonitor
- 101 keyboard
- MS DOS 6.0

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386DX-40 $975

- 386DX 128K MB
- 4MB RAM
- Mini-Tower Case/Power Supply
- IDE & I/O Controller
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- Keytronic 101 keyboard
- MS DOS 6.0

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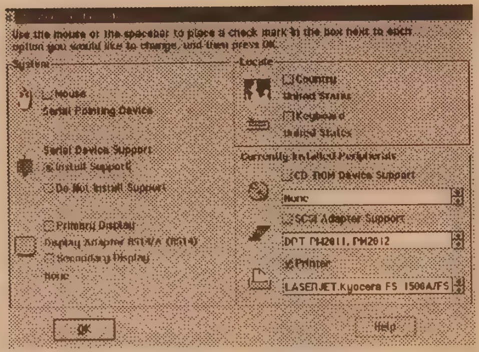


Use the mouse or the spacebar to place a check mark in the box next to each option you would like to change, and then press OK.

System

☐ Mouse
Serial Pointing Device

Serial Device Support
● Install Support
○ Do Not Install Support

☐ Primary Display
Display Adapter 8514/A (8514)
☐ Secondary Display
None

Locale

☐ Country
United States
☐ Keyboard
United States

Currently Installed Peripherals

☐ CD-ROM Device Support
None
☐ SCSI Adapter Support
DPT PM2011, PM2012
☒ Printer
LASERJET.Kyocera FS 1500A/FS

Figure 1: Hardware Drivers Installation

you really need, as you can always add others later through a facility called Selective Install. The installation facility keeps track of space on the installable partition, noting both how much room remains and how much space your selected features will require. This is a nice convenience which helps with decisions.

The first set of features is not optional and involves the drivers for your hardware, as Figure 1 shows.

OS/2 automatically installs built-in drivers for hardware it recognizes (in my case, a serial mouse, serial port support, the video card in 8514/A mode, and the SCSI hard disk adapter). The default printer is marked for installation, because the install program needs you to choose your printer from the many models supported. On this panel, therefore, mark only those features you want to *change;* otherwise just click on OK. You will then be allowed to browse a long list of supported printers, from which you can choose the one you have. (If your printer is not supported *directly,* find out what emulation it supports and choose the emulated printer). My Kyocera FS1500-A Ecosys printer is a LaserJet III compatible, directly supported by a driver.

Figure 2 shows the panel that lets you select the OS/2 features you want to install (this is also the panel of the Selective Install facility mentioned above).

By default all of them are selected but, as the figure shows, I deselected some of them. Note also that some features have subfeatures you can choose or reject by clicking on the More option next to them. Figures 2A–2D show my selected subfeatures for online documentation, fonts, system utilities, and DOS (Virtual DOS Machines).

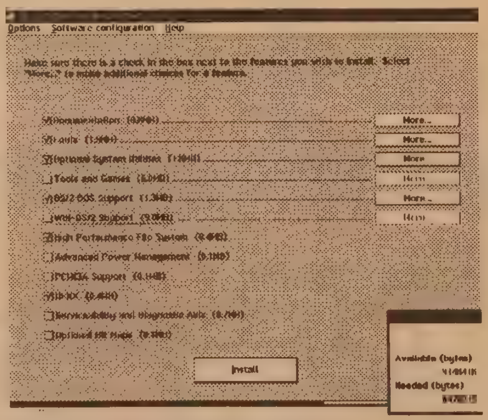
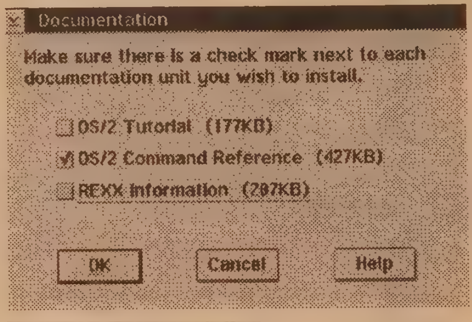


Figure 2: OS/2 Installable Features

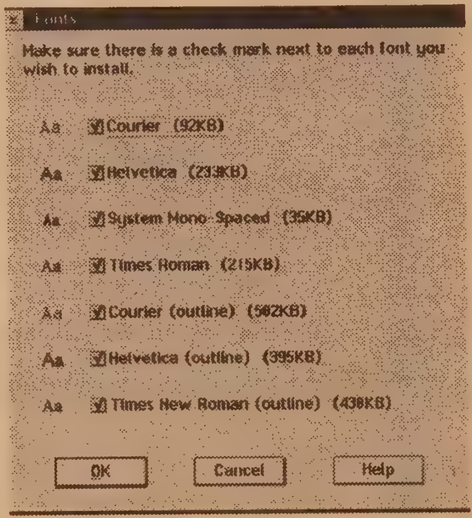


Documentation

Make sure there is a check mark next to each documentation unit you wish to install.

☐ OS/2 Tutorial (177KB)
☑ OS/2 Command Reference (427KB)
☐ REXX Information (797KB)

Figure 2A: Documentation

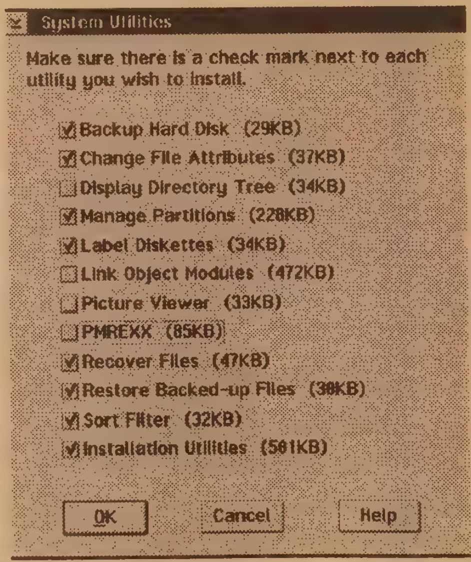


Fonts

Make sure there is a check mark next to each font you wish to install.

☑ Courier (92KB)
☑ Helvetica (233KB)
☑ System Mono-Spaced (35KB)
☑ Times Roman (215KB)
☑ Courier (outline) (502KB)
☑ Helvetica (outline) (395KB)
☑ Times New Roman (outline) (438KB)

Figure 2B: Fonts



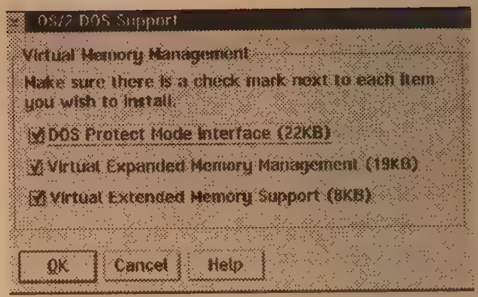
System Utilities

Make sure there is a check mark next to each utility you wish to install.

☑ Backup Hard Disk (29KB)
☑ Change File Attributes (37KB)
☐ Display Directory Tree (34KB)
☑ Manage Partitions (228KB)
☑ Label Diskettes (34KB)
☐ Link Object Modules (472KB)
☐ Picture Viewer (33KB)
☐ PMREXX (85KB)
☑ Recover Files (47KB)
☑ Restore Backed-up Files (38KB)
☑ Sort Filter (32KB)
☑ Installation Utilities (581KB)

Figure 2C: System Utilities

I also installed—and you should too—the REXX language (because it is required for the OS/2 .CMD files, the equivalent of DOS .BAT files, and by many utilities and commercial applications). If you intend to take advantage of High Performance File System (HPFS) (see last month's column), you should select it too. I did not install Windows 3.1 support (called WINOS2), tools and games, Advanced Power Management and PCMCIA support (both are for laptops), the Servicing and Diagnostic Aids, the optional bit maps, and the new multimedia capability (MMPM/2). My choices took close to 14MB of hard disk space out of the maximum 28MB.



OS/2 DOS Support

Virtual Memory Management

Make sure there is a check mark next to each item you wish to install.

☑ DOS Protect Mode Interface (22KB)
☑ Virtual Expanded Memory Management (19KB)
☑ Virtual Extended Memory Support (8KB)

Figure 2D: DOS Features

Having selected your desired features, you then click on Install, and start feeding the remaining diskettes as prompted, watching a graphical display of the transfer of files to the hard disk.

If you already have DOS, Windows, and OS/2 applications, you are offered the option to *migrate* them. The migration facility scans all your drives and partitions; if it identifies programs stored in its database, it installs them as icons in folders on the OS/2 desktop, ready for you to invoke (more of this in future columns). If you install 2.1 over a previous version of OS/2, you can also migrate the old CONFIG.SYS and DOS AUTOEXEC.BAT files if you want (my recommendation is to do this manually when you have a better understanding of these files under OS/2, about which more later).

If the process completes successfully, you are asked to reboot the system. On this first boot you will not see the Boot Manager menu; only subsequent boots will present it. The new version of OS/2 will automatically boot, and if you're one of the lucky users who do not experience quirks—you should get the new Work Place Shell (WPS) desktop, as shown in Figure 3. ■

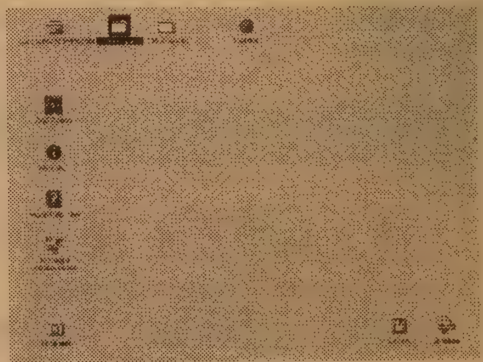


Figure 3: WPS Desktop—OS/2 2.1

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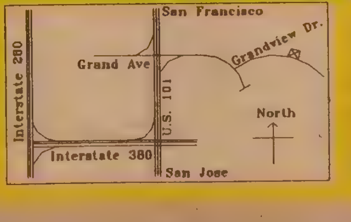

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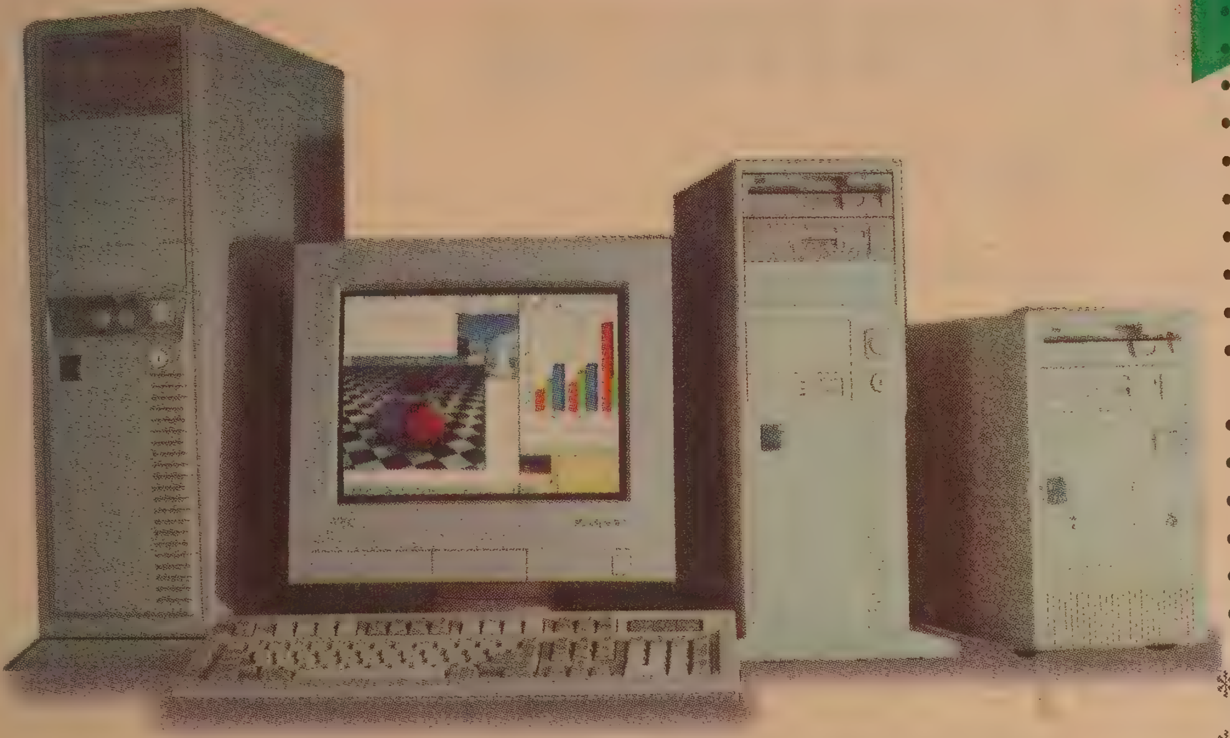

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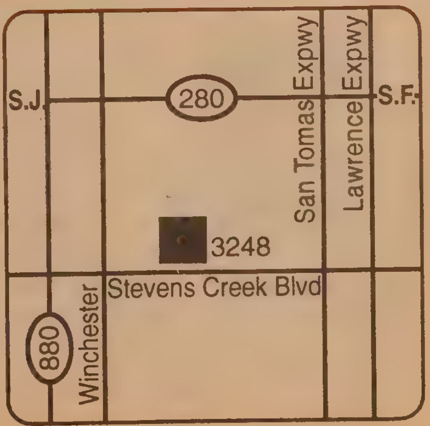

BMUG In The Virtual Universe

Beyond Time And Space

BY DAVID MORGENSTERN

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One of our family's favorite summer pastimes is to check out the blockbuster mega-hit movies. While my wife and daughter are busy experiencing the plot twists, hopeful Academy Award characterizations, and hunk actors, I'm scanning the background for computer product placements.

There was a bumper crop of computer effects and computer placements in *Jurassic Park*. However, the cloning of Barney and his compatriots from a mosquito's stomach was not the only future high technology featured in the film. Could I have been the only onlooker to see a Batman-like prototype Newton hiding on a desk between an SGI and a Quadra? There's a shot where you can clearly see the palmtop, flip-top open, revealing a Newton-like LCD screen. Or perhaps this was the model used by the Tyrannosaurus Hex?

> The cloning of Barney and his compatriots from a mosquito's stomach was not the only future high technology featured in *Jurassic Park*. Could I have been the only onlooker to see a Batman-like prototype Newton hiding on a desk between an SGI and a Quadra?

THE POST-MODEM AGE

What's the most important add-on purchase for the new computer user? A CD-ROM drive or hand scanner? A plastic giant shark fin for the top of the monitor? There are a thousand and one products that crowd the computer store shelves to tempt us. But there's really only one correct answer—a modem.

The MOdulator-DEModulator is a device that lets computers speak to each other over phone lines. It turns a computer's digital talk into an analog signal (another name for smart noise) that can be sent through ordinary telephone lines to a second modem for conversion back to the original data format.

Like everything else connected with computer technology, the manner in which this miracle is accomplished is constantly evolving. An alphabet soup's worth of different protocols can confuse the new user, but there's nothing to worry about. It's worth the extra money to buy a fast modem that supports the V.32bis protocol, even though it requires a special "hardware handshake" cable (most stores bundle everything together for you). The model with the most favorable mentions in BMUG meetings right now is the US Robotics Sportster 14,400 modem.

Modems will not speed up or improve the operation of your Macintosh. They do not of themselves give you any output, or product that you can touch with your hands. Instead, the modem moves you out from your solitary relationship with your computer desktop, and into the entire world's computing space. If the computer can be thought of as a silicon extension to your brain, then the ability to connect to other computers must be the virtual enhancement of our senses and spirit. I often feel as if I'm reaching out with my mind, embarking on an excursion to new virtual places. When I'm connected to an information server across the country, I experience the same emotions as when I'm walking down the streets of a new city, town, or neighborhood, wondering what I'll discover next.

This technology gives me the opportunity to get to know and correspond with persons I've never met in the flesh. If I need to find out something, almost anything under the sun, I can ask a question online, and receive an answer. The absolutely indisputably correct answer? Perhaps not, but it's something. The ability to interact with people and information through silicon and copper has created a new form of interpersonal communication.

Online communication combines the gestures of writing, the speed of telephones, and an easy atmosphere of collaboration. The writing of a letter or memo has usually been the final act of a thought process. When the ink hits the paper the thought becomes memorialized, with the weight of a specific time and place. The letter is then mailed, not to be received for days. Online documents have a more fluid feeling, perhaps because of the speed in which they are sent, and the answer returned.

Email messages are often dashed out, sometimes just a couple of words, or a few lines, much like an electronic postcard. Imagine the times you've wanted to say something to someone—nothing great or

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profound, just a little thought that crossed your mind. Most of those thoughts go unsaid, because it's too much trouble to call someone "just for that." But email makes that kind of little note as simple as rice pudding.

If you write someone a letter with pen and paper, it's unlikely that you'd keep a copy for yourself. Email and other forms of electronic communication give you copies in spades, and lend themselves to quoting from past documents. It's not uncommon to see a stream of quotations from past messages: "This guy said this, then this guy said that, and I say Phooey!"

Online communication has elements that appeal to many different personality types. Introverts like being able to contact others at their own time and pace, without having to go through an entire phone call or meeting. Very social individuals can feel connected to everyone with an ever-filling cornucopic electronic mailbox, sending out messages to many people at a single mouse click. People with their heads in the clouds will find the stratosphere a less lonely place, with thousands of fellow dreamers. Those who love to nail down every little fact can quote to their hearts' content. Everyone can find something positive to say about electronic conversation—but perhaps also something negative.

> If the computer can be thought of as a silicon extension to your brain, then the ability to connect to other computers must be the virtual enhancement of our senses and spirit.

THE ELECTRONIC DÖPPELGÄNGER

The original electronic communicators were the pioneers on the Internet, the now international network of governmental and educational UNIX computers. Although this crowd was pretty weird, they pretty much spoke the same language and shared similar values. As the network has opened up to a wider variety of users—nontechnical students and faculty, young kids, companies, and small interest groups—it has come keyboard to keyboard with different cultures and standards.

Every online service has occasional troubles with users who think they know better than anyone else, and are going to electronically beat up anyone who thinks differently. Anything that can cause an argument in "real life" can cause an electronic riot on line. People forget that email messages still have much of the impact of written communication, and subtle nuance and satiric asides are often misinterpreted. Long-time online dwellers have learned to automatically compensate for this tendency, but newbies often have their feathers ruffled at the sledge-hammer responses. "Online communication is different, and new rules in interpersonal relationships haven't really evolved yet," said Steve Costa, BMUG Director. "That's why there can be so many nasty flame wars on bulletin board services."

Some users get their kicks by heaping abuse on others. There is even a meeting place on the Internet especially for these silicon bullies, called alt.flame (a flame being an insult), which appears to be a collection of profoundly disturbed people who enjoy flinging vile insults and garbage at each other. Unfortunately, the tirades can spill over into innocent bystanding groups, shocking and offending people.

Each network has its own standards (or lack theref) that it applies to online behavior. I have had my own personal experience with the interaction of America Online (a national commercial service), their terms-of-service watchdogs, and the language that makes its way into the messages of teenagers. I will go into this in more detail at another time, but here's a quick tip: Get your kids their own account, unless you don't mind getting booted off the air. Ah, the words that fall off the fingers of babies...

THE DAILY PLANET BMUG

Just as BMUG has created ways for computer users to exchange ideas in the physical world through our many meetings and telephone HelpLine, we've also tried to do the same in the virtual domain. The BMUG BBS has grown over the past eight years into a telecommunications service for our members, and one of the most active Macintosh boards in the world.

The BMUG BBS was started in 1985 by Sam Roberts, a law student, and Raines Cohen, cofounder of BMUG, on a 512K "Fat Mac" with a single phone line. (The BMUG office at that time was in the Berkeley home of founder Reese Jones.) They were soon joined by Phil Reese, a doctoral student in education, who valiantly served as our system operator (Sysop) until he moved to Los Angeles and got a life.

In 1988, BMUG bought a '286 DOS PC that ran eight lines simultaneously. Bernard Aboba, author of the online reference, *The BMUG Guide to Bulletin Boards and Beyond*, was volunteered to work countless hours helping to support that system. Bernard was one of the few hard core BMUGers at that time who had both a PC and a Mac on his desktop.

This PC bulletin board was fine, but it was not easy to use—meaning that it didn't look and work like a Macintosh! Our members wanted a graphic user interface, not a text-based system.

Finally, FirstClass by SoftArc came on the market. We felt that FirstClass, if stretched beyond its limits, might meet our needs. After many months of hard work, our new 18-line BBS, Planet BMUG, made its public appearance in September 1992.

The Planet has been an overwhelming success, and the number of members that use the BBS has increased fivefold. Our resolute Sysop, Dong-Gyom Kim, has been living and sleeping with the system, nursing it along and keeping the five thousand users connected to each other.

FirstClass is more than a pretty face with icons and folders. Since it runs on a Macintosh, it allows different fonts, colors, and styles in messages. It also has many amazing features, including the ability to do several things at once. Unlike what you'll experience on most other telecommunications systems, you can be downloading a file, reading and sending messages, and "chatting" with someone online at the same time. Believe it or not, your Planet desktop does not slow down to a crawl while all this is going on.

Another wicked feature is the way FirstClass encloses files within messages. Any file can be enclosed within a message,

continued on page 270

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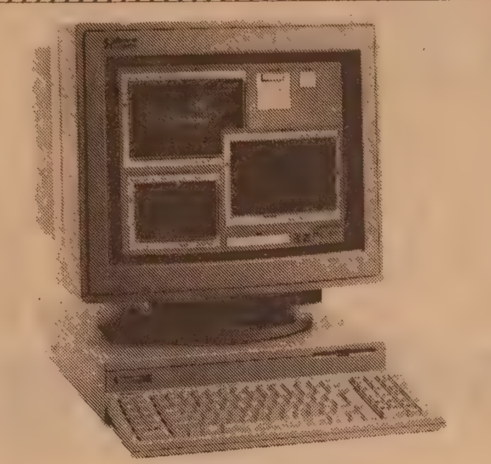

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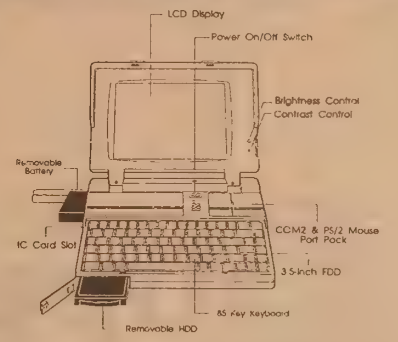

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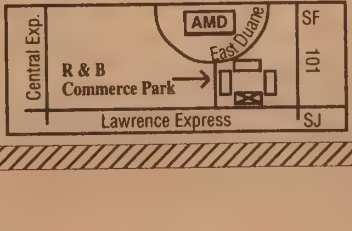

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Upgrading To A Windows System

Hardware Buying Tips

BY LENNY BAILES

So you've decided that Microsoft Windows appeals to you enough that you want it on your computer as your principal operating environment. Maybe you've seen it demonstrated on a high-powered machine, or you've made your decision even after struggling with Windows on a low-end machine. The right hardware can make all the difference between brisk, satisfying performance, or a system that leaves you watching sluggish applications creep across the screen at a snail's pace.

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You may see a marked improvement in video performance, redrawing the screen. Applications like Word for Windows and CorelDRAW will be more robust, performing internal functions more rapidly, saving documents faster, and saving time on tasks like search and replace or resizing/reformatting a drawing.

The right hardware can make all the difference between brisk, satisfying performance, or a system that leaves you watching sluggish applications creep across the screen at a snail's pace.

Although many vendors will tell you that 4MB is a sufficient amount of RAM to run Windows, you would actually do better with 8MB. Four megabytes can handle the overhead of launching Windows itself and allow one heavyweight program to swap itself in and out of memory from disk. Trying to multitask DOS programs with only 4MB may result in still more time-consuming disk access. Although you may launch more than one application in 4MB, you will certainly spend more time watching the Windows hourglass and your hard drive access light than you will with an 8MB system.

The 486 systems currently available from dealers come in all sizes, shapes, and speeds. The distinguishing feature between 486SX and 486DX systems is that the DX systems read and write along the system bus to memory and peripherals at 32 bits instead of 16 bits. This means that a DX machine rated at 33MHz will deliver faster performance than an SX at the same rated clock speed. The savings at the dealer for SX vs. DX at a given clock speed will amount to $200 to $400. Some manufacturers currently offer motherboards that can accommodate either an SX or a DX processor, giving you the option to purchase a starter system and upgrade it at a later date. To further complicate the issue, Intel now has a series of "clock-doubled" chips that use the same old speed when writing to and from peripherals, but perform internal arithmetic computations at twice the ordinary speed. "Clock doubled" systems are currently being pushed by manufacturers because of the dramatic performance increase they offer on some system functions for a relatively small increase in price.

Another issue in the purchase of a new 486 system is the addition of "local bus" video and disk access. With older 386 and 486 systems, the speed at which the CPU receives information from peripherals in the system is limited to the speed of the system bus, which is typically 8MHz to 11MHz. New 486 systems may incorporate direct 32-bit access to the CPU from specially built local bus slots on the motherboard. Local bus video generally tends to provide faster redrawing of the screen, which is particularly noticeable in Windows. Major vendors of graphics cards now offer support for local bus video in accordance with a standard called VL VESA. Some systems also permit local bus access for the disk controller.

Intel has paved the way for a faster, newer breed of computer with its Pentium family of processors, but as yet there are problems to be worked out with these machines, and they're significantly more expensive than their 486 counterparts. These machines will certainly run Windows more efficiently when they are readily available, but they were really designed for higher-powered operating systems and networked environments. Intel has introduced a series of "Pentium" Overdrive chips, similar to the upgrade processors for 486 machines, but these are still being tested and may prove to be of limited value with computers designed for the 486 CPU.

SPEED FACTORS

The crucial hardware elements for speedy Windows performance are the hard disk, memory, CPU, and video adaptor.

A fast hard disk may be even more important for Windows than a top-of-the-line CPU. There are several different disk interfaces currently being offered on the mar-

continued on page 286

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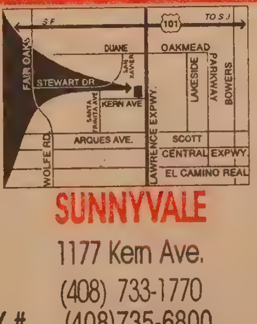

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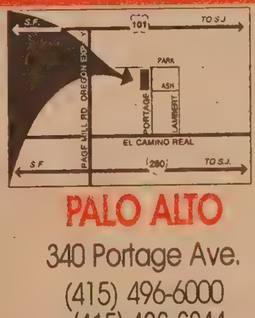

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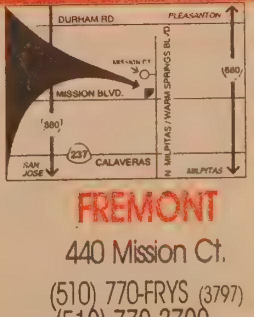

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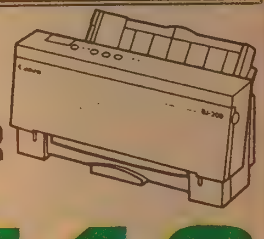

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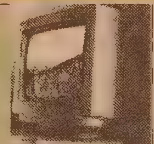

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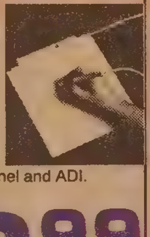

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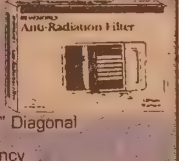

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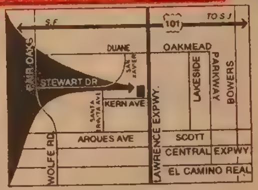

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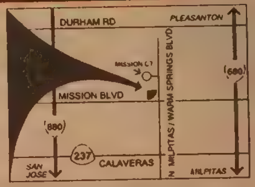

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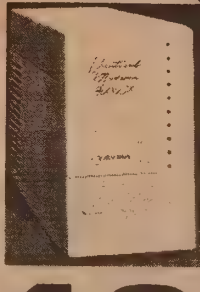

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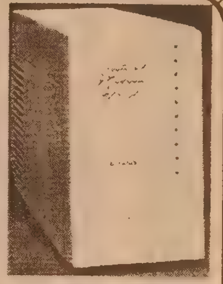

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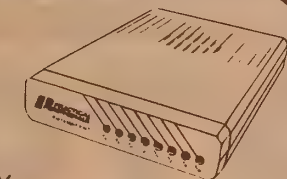

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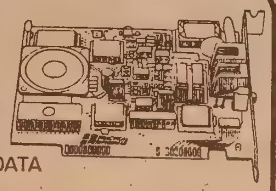

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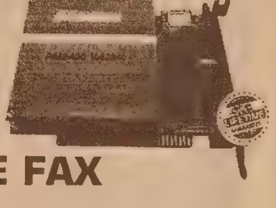

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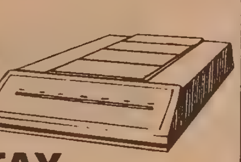

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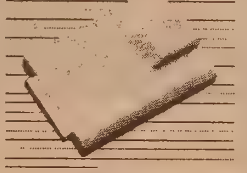

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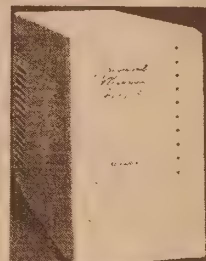

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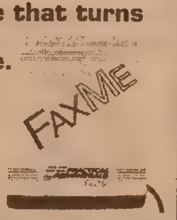

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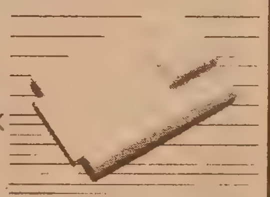

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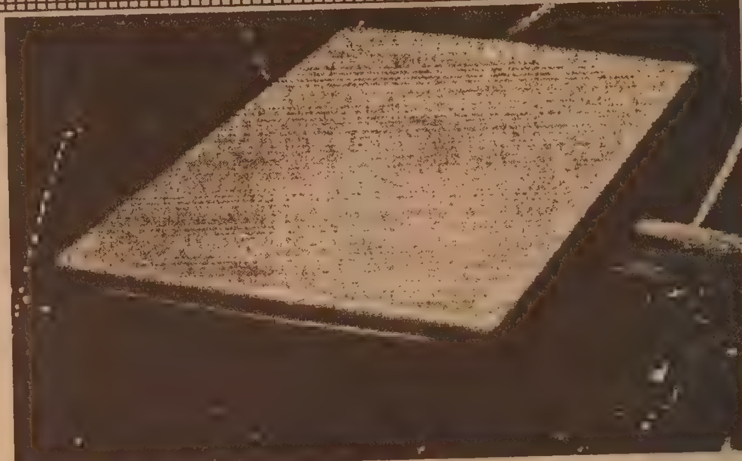

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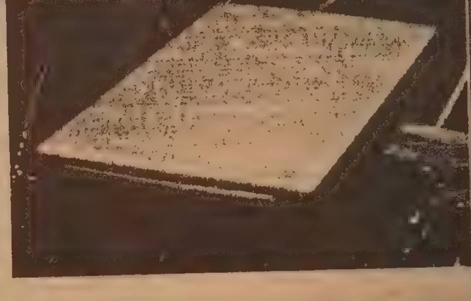

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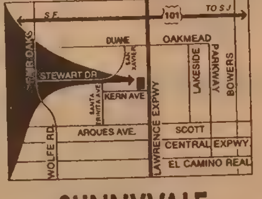

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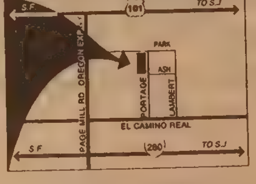

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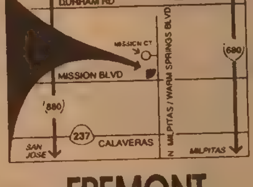

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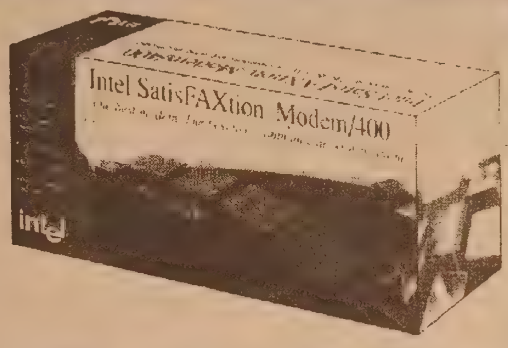
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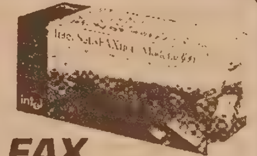

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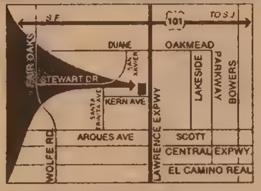
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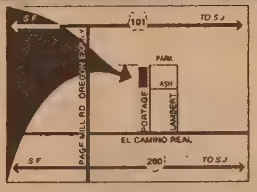
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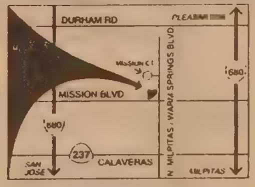
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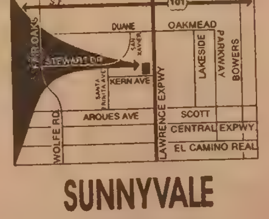
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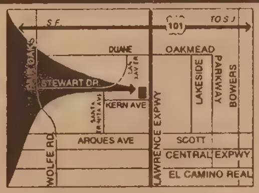
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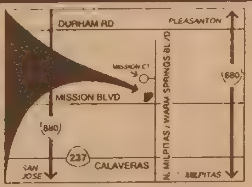
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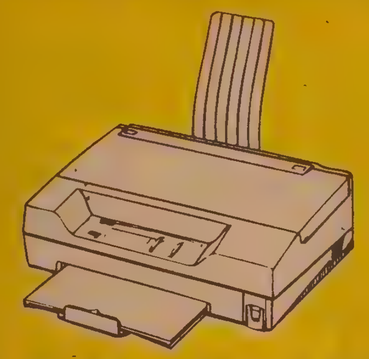

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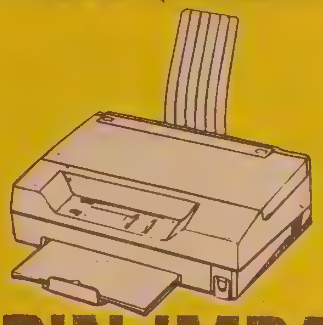

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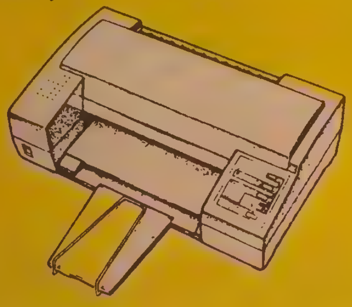

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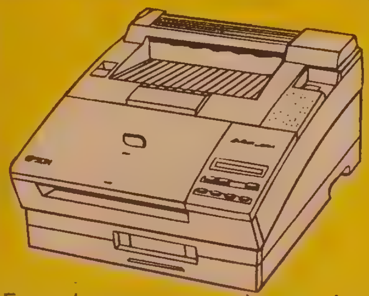

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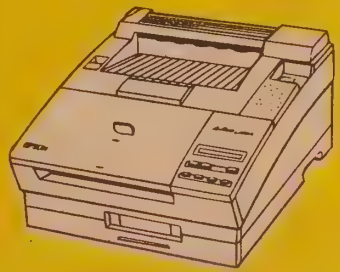

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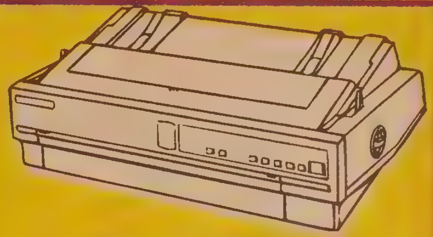

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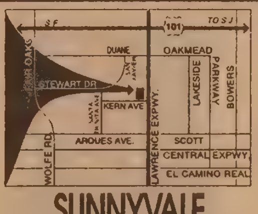

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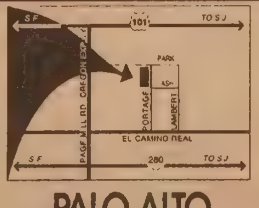

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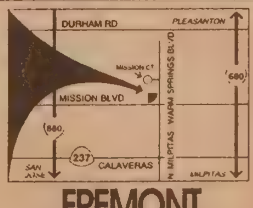

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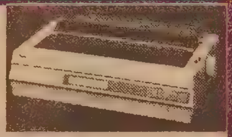

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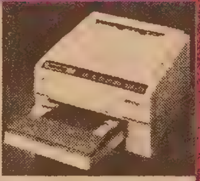

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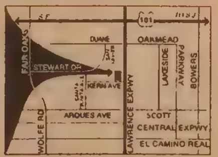

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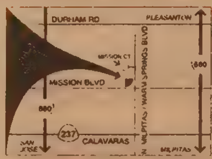

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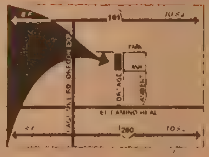

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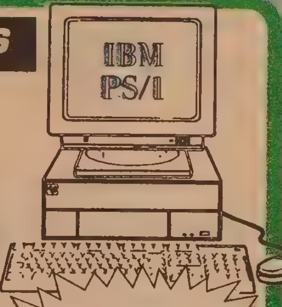

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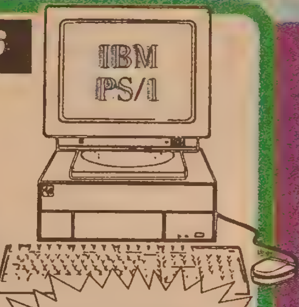

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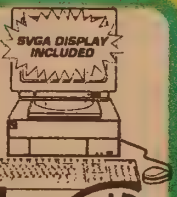

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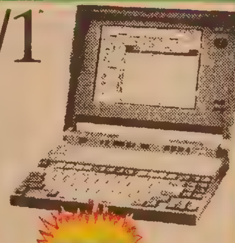

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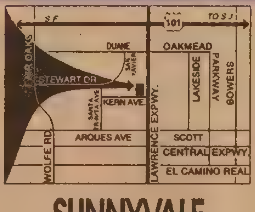

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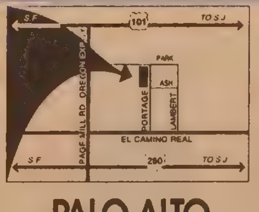

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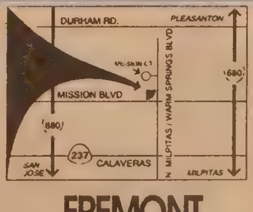

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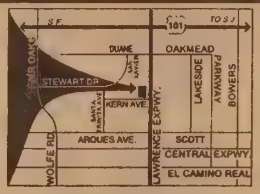
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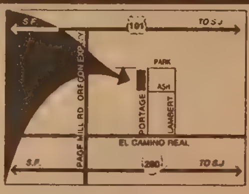
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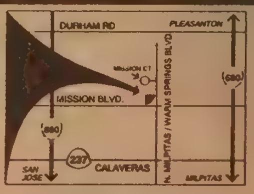
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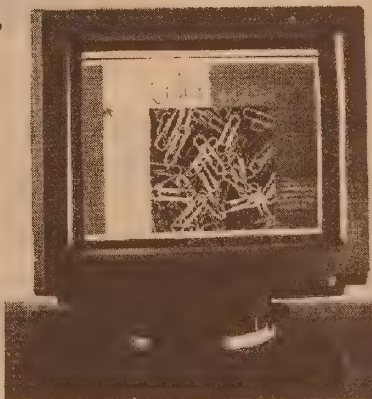

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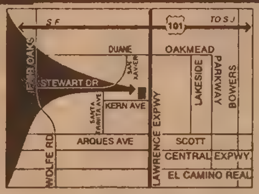
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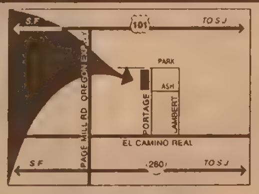
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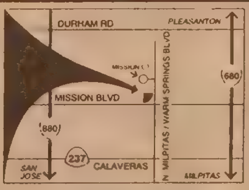
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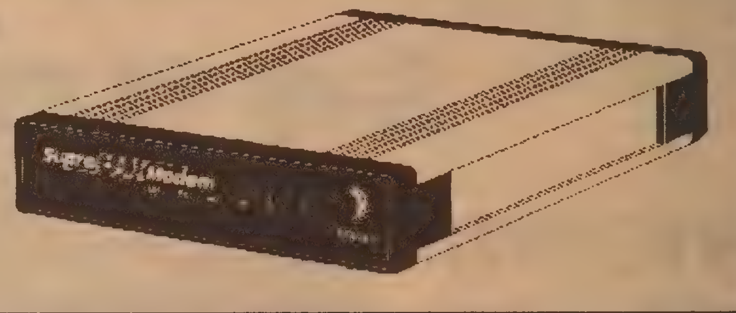

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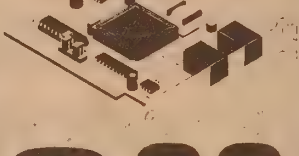

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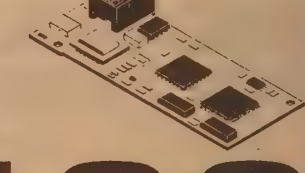

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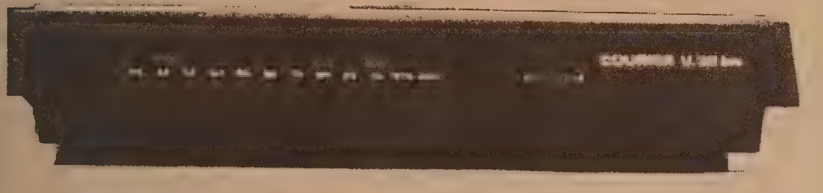
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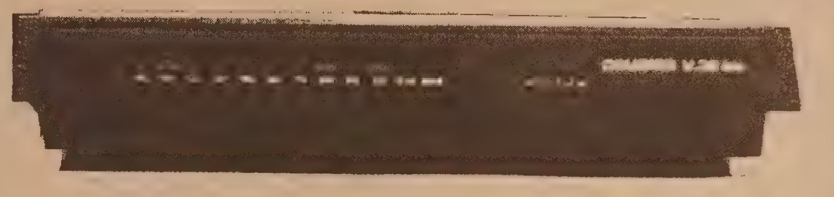
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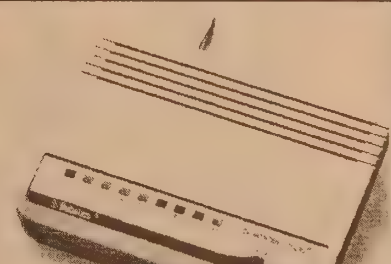
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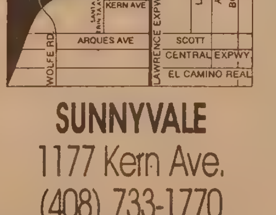
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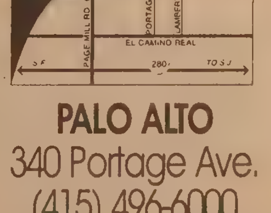
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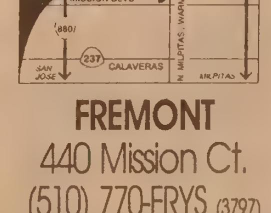
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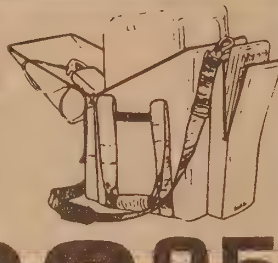

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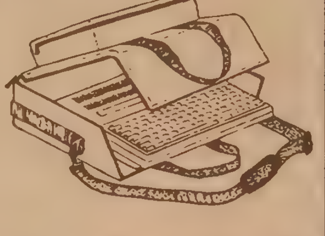

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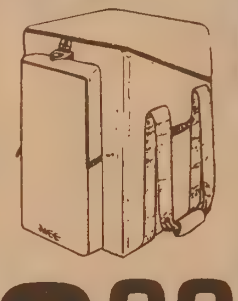

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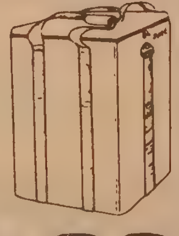

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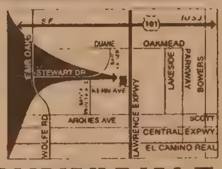
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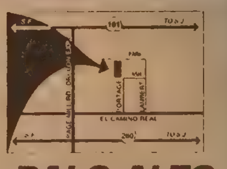
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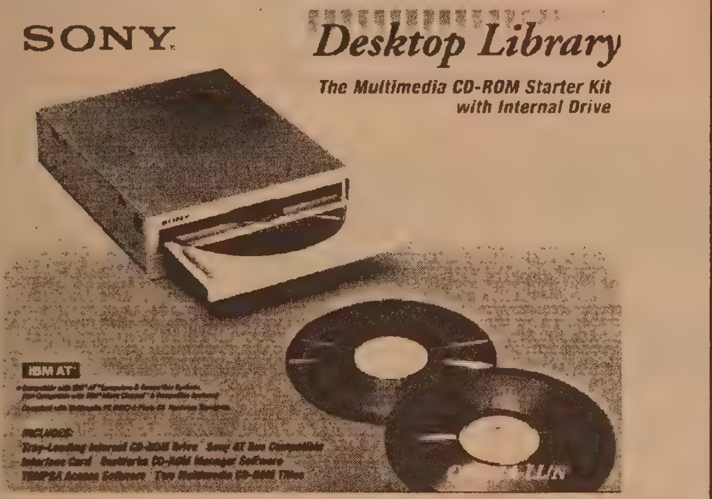
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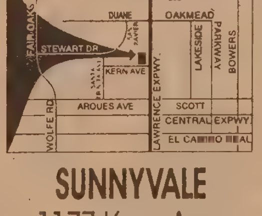
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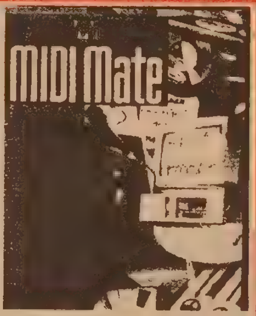

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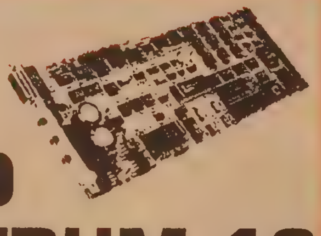

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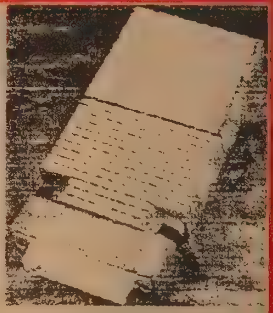

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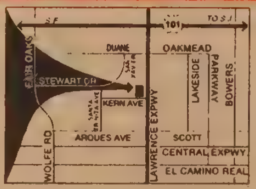
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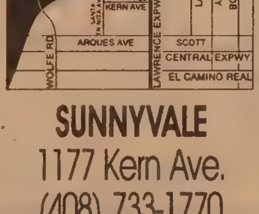
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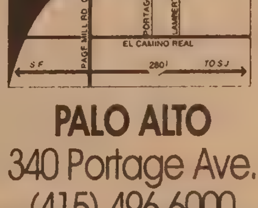
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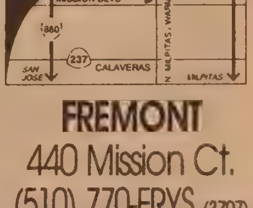
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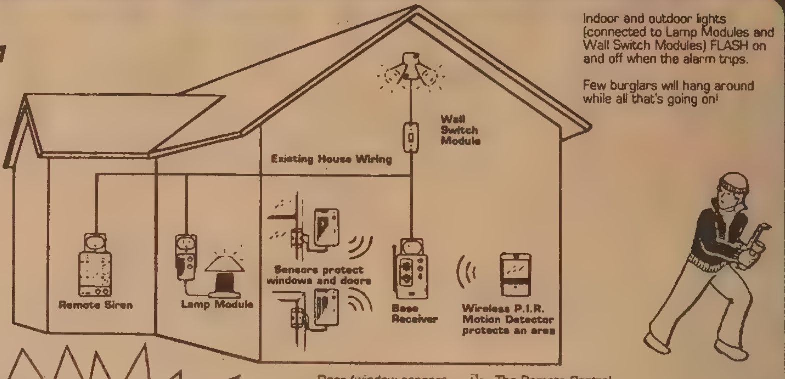
Wall Switch Module
Existing House Wiring
Sensors protect windows and doors
Remote Siren
Lamp Module
Base Receiver
Wireless P.I.R. Motion Detector protects an area

Indoor and outdoor lights (connected to Lamp Modules and Wall Switch Modules) FLASH on and off when the alarm trips.

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Door/window sensors and remote controls send wireless signals to base receiver

The Remote Control arms and disarms the system and controls lights remotely

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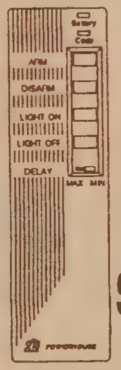

REMOTE CONTROL

The system is armed and disarmed by the press of a single button-simple! You can also control lights remotely.
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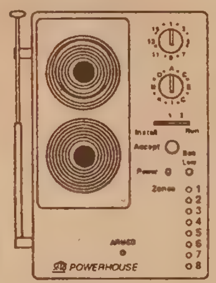
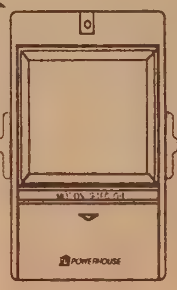


BASE RECEIVER

Base Receiver makes a loud noise when alarm is tripped and sends signals over existing house wiring to flash lights connected to X-10 modules.
Model BR521
Included in kit

Not sold seperately. Sold as part of the security system only.



MOTION DETECTOR

Supervised Wireless Motion Detectors send signals to trip the Base Receiver's alarm when someone walks within range.
Model SP544
Optional
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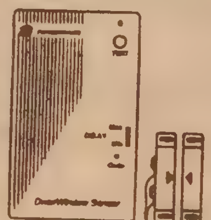

DOOR/WINDOW SENSOR

Sensors send wireless signals to the Base Receiver when a door or window is opened. You can protect up to 16 door/windows by adding more sensors. Sensors are supervised for professional reliability- they report in to the Base Receiver every 90 minutes.
Model DW534
Included in kit
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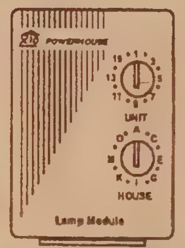

LAMP MODULE

A lamp plugged into the Lamp Module will flash on and off when the alarm trips. You can also turn the lamp off and on by remote control.
Model LM465
Included in kit
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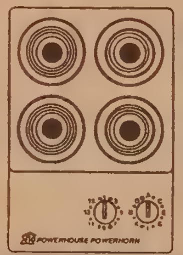
$12.95



POWER HORN SIREN

Remote wireless 110 dB siren receives signals over house wiring and trips when Base Receiver's alarm is tripped.
Model PH508
Optional
#1515453

$49.95

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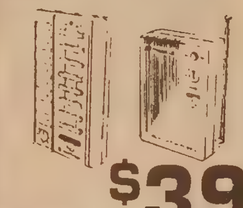
WIRELESS REMOTE CONTROL RC5000



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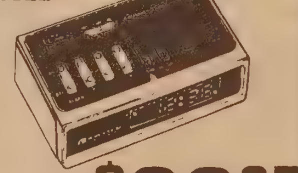

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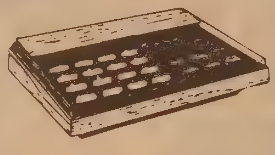

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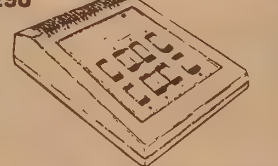

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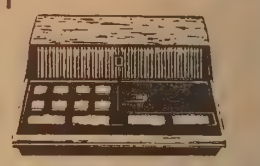

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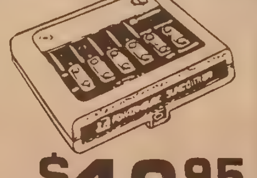

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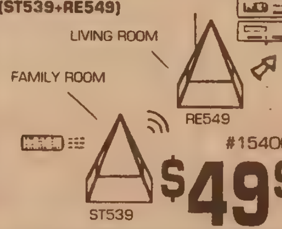
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FAMILY ROOM
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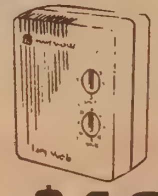
LAMP MODULE LM465



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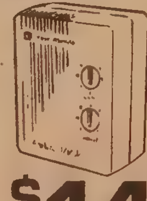

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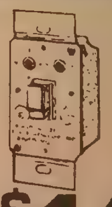

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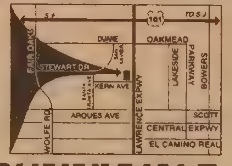
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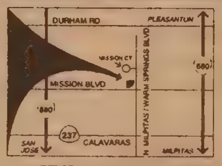
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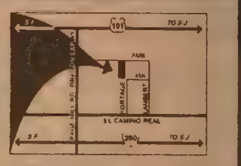
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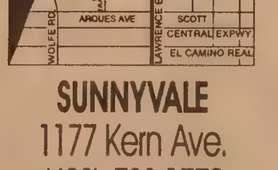
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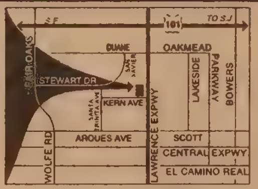

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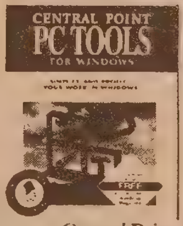

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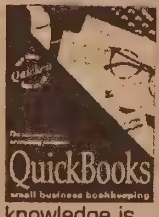

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Microsoft CINEMANIA

Explore the magic behind the movies! From contemporary to classic films, Cinemania is the fast, fun personal guide that lets you see and hear it all - the reviews and biographies, the faces and voices, the inside stories. For every movie lover, Cinemania is a incredible new view of the movies.

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THE SEVENTH GUEST CD-ROM

The Seventh Guest is the first interactive drama in a terrifyingly real, virtual environment complete with live actors. Key Features:
- Video clips with live actors.
- Bizarre games and puzzles.
- 22 fully-rendered rooms to explore in a fully 3-D haunted mansion with ghostly surprises lurking in every shadow.

Virgin GAMES

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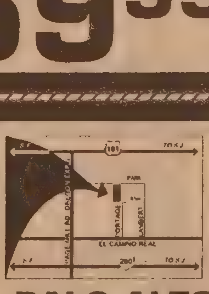

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Answering system with Auto-Logic Operation, Tone Remote Control, Digital Display, Message Memo Recording and Remote turn on, Auto-Logic Operation Automatically Rewinds, Plays Messages, Stops at the Last Message and Resets itself at the Touch of One Button.

Model KX-T1000 #1498194 **$39.95**

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DUAL MICRO CASSETTE ANSWERING SYSTEM

Panasonic's new dual micro cassette answering system offers an LCD Call Counter, marker message, room monitor, auto disconnect, electronic auto disconnect, electronic volume control, audible message alert, and much more for only...

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SPEAKERPHONE

For the office or home, this phone has all the features you need. It has a speaker phone, 28 station automatic dialer, automatic redial and much more.

MODEL KX-T2315 #1530100 **$39.95**

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SPEAKER PHONE

This outstanding value from Panasonic offers one-touch dialing for up to 28 16-digit telephone numbers, auto redial for up to 15 times, redial memory transfer, and a save button for temporary redial memory storage for only...

MODEL KX-T2355 #1287186 **$49.95**

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LCD READOUT SPEAKERPHONE

This outstanding value from Panasonic offers a 12-digit LCD readout for phone number, clock, call timer(minutes & seconds), and operating modes. Perfect for the home or office at only...

MODEL KX-T2365 #163665 **$69.95**

MULTI-LINE BUSINESS PHONES

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TWO LINE PHONE

A two line phone doesn't have to cost a fortune. Panasonic has the low cost answer for you. This unit has a convenient auto dialer, conference calling and much more!

MODEL KX-T3110 #1505313 **$49.95**

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2-LINE SPEAKERPHONE W/ LCD DISPLAY

From Panasonic comes this fully featured 2-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 24-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only...

MODEL KX-T3175 #1745122 **$89.95** AVAILABLE IN BLACK OR WHITE

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3-LINE SPEAKERPHONE WITH LCD DISPLAY

From Panasonic comes this fully featured 3-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 48-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only...

MODEL KX-T3185 #1768039 **$159.95** AVAILABLE IN BLACK OR WHITE

CORDLESS PHONES

Panasonic

10 CHANNEL AUTOSCAN CORDLESS PHONE

Panasonic's newest cordless phone comes equipped with a retractable antenna flexible rubber antenna, sound charger technology, which helps filter out background noise resulting in enhanced sound quality, and 1-way paging between the base and handset. An excellent value at only...

MODEL KX-T 3850 #1764839 **$79.95** AVAILABLE IN BLACK OR WHITE

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10 CHANNEL CORDLESS SPEAKER PHONE w/LCD HANDSET DISPLAY

If you want the phone that has it all, come and see this one today! The hot new KX-T3920 from Panasonic is like having two phones in one! You can talk and dial from the base or talk back and forth thru the intercom. And it even has a 16 number Automatic dialer!

MODEL KX-T3920 #1768051 **$149.95**

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10 CHANNEL CORDLESS SPEAKERPHONE WITH DUAL MICROCASSETTE

This new top of the line cordless dual microcassete answering system with sound charger technology delivers sound so clear, you will hardly believe your ears! Some of the features included are, 2 way paging, intercom, auto security system, message alert, 2-way and memo recording just to name a few. Now only...

MODEL KX-T4400 #1735370 **$199.95** AVAILABLE IN BLACK OR WHITE

FAX MACHINES

Panasonic

FAX MACHINE WITH ANSWERING MACHINE AND ANTI-CURL

This fully featured Fax from Panasonic comes equipped with an auto-logic answering system and anti-curl, as well as copier capabilities. It's the perfect secretary for your home or business!

MODEL KX-F150 #1770001 **$399**

Panasonic

FAX MACHINE WITH PAPER CUTTER AND ANTI-CURL

This fully featured Fax from Panasonic comes equipped with an auto-logic answering system and auto paper cutter, as well as copier capabilities. It's the perfect secretary for your home or business!

MODEL KX-F250 #1770023 **$469**

Panasonic

PLAIN PAPER LASER FACSIMILE

It's an answering machine, integrated telephone, plain paper laser facsimile with copier capabilities all rolled into one! The 250 page paper cassette, along with the 20 page document feeder makes this the perfect facsimile for businesses that need high volume capability along with clear fax resolution.

MODEL KX-F5000 #1688506 **$1397**

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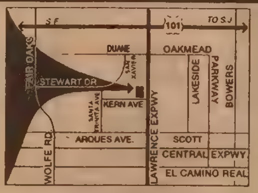

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SHARP PERSONAL ORGANIZER

Perfect for the business person on-the-go, this compact data bank incorporates a 14 x 3 line display, built-in calender, schedule, phone/memo, memo pad, expense, clock, anniversary, and calender functions as well as QWERTY keyboard to simplify data entry. Once you've used this electronic marvel, you won't leave your home or office without it!

MODEL
Y0-100
#1800665

$\$49^{95}$

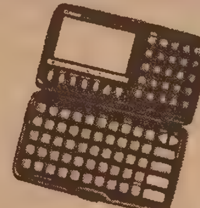
SHARP 128KB BUSINESS ORGANIZER

w/WIDE SCREEN DISPLAY

In today's world, It's sometimes hard to keep track of where you've been, who you've seen, and where you're going, but now it's as easy as saying "S.H.A.R.P!" With this deluxe business organizer, you can store approximately 2,470 names and numbers or 1,740 schedule appointments (128K), but that's just the beginning, the unit's internal memory can be allocated between 10 major built-in functions: An integrated schedule and to do list with 3 different calender views, 3 phone/address books, business card file, memo pad, outliner, home and world time clocks, and a calculator. You can send/home and world time clocks, and a calculator. You can send/receive electronic mail using built-in terminal emulation software and an optional PC modem, as well as, exchange data with your PC or Mac using an optional PC interface software and cable package.
A must for any business person on-the-go at only...
MODEL Y0-610 #1753444

$\$199^{95}$

CASIO 32K DIGITAL DIARY



Why carry around a calendar and schedule book, telephone directory and notebook, when you can do it all and more with this new digital diary from Casio.
Optional PC and Mac links also available.

MODEL
SF-4300
#1647189

$\$59^{95}$

CASIO B.O.S.S. w/64KB MEMORY

This business organizer scheduling system comes packed with powerful functions that are practical and easy to use. The QWERTY Keyboard, telephone directory, calendar, memo function, schedule alarm, world time function, home time function, and schedule keeper will prove to be an invaluable tool in keeping your busy days in order.
An excellent investment at...

MODEL
SF-5300
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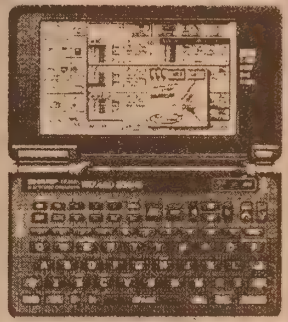
SHARP 512K PERSONAL ORGANIZER

w/TOUCH SCREEN TECHNOLOGY



This Sharp Wizard lets you leave your portable computer at home but puts the power of that computer in your pocket! Here's a small sampling of the innovative features. Touch screen technology which allows you to write or draw on the screen using the Wizard pen, filer which organizes related data into folders that can be transferred to another touch screen Wizard via infared, and a true word processer with a large screen display and a keyboard that's 75% the size of a standard PC keyboard. The possibilities are endless at only...

MODEL
OZ-9600 II
#1797152

$499

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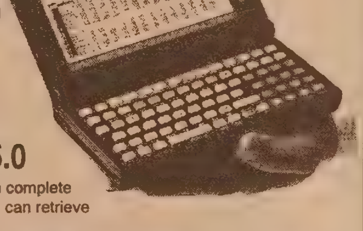

It's here ! The smallest, lightest HP PC ever comes equipped with complete organizer software to manage your time, tasks and data, plus you can retrieve information instantly with a full range of built-in personal productivity tools. The pull-down menus and dialogue boxes make it simple to master the familiar commands, and the high-resolution display with zoom option is easy to read !
With lotus 1-2-3 built-in you will have full spreadsheet capability, including graphics and macros. Also includes CC:Mail built-in. Now only...

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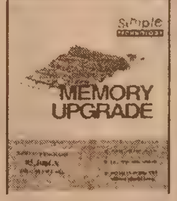

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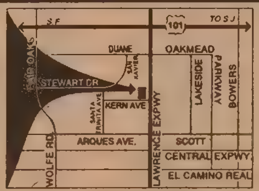

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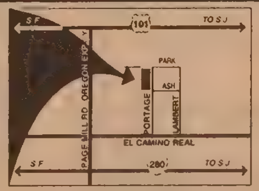

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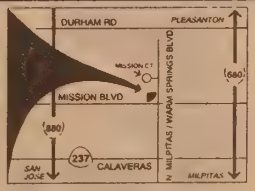

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ALL DIGITAL ANSWERING MACHINE WITH VARIABLE SPEED MESSAGE PLAYBACK

Sony has taken digital technology to a new dimension with this beautifully-designed, all digital answering system. The variable-speed message playback controller allows you to speed up (to 1.6 times speed) or slow down (to 0.7 speed) playback of messages without changing pitch. In addition, you can skip, repeat or backspace messages. The multi-function LCD display functions as a digital message counter, clock, call timer, answer mode indicator, and back-up battery strength indicator, while the voice time/day stamp automatically records the time of the message receipt after each message. Other features include: Voice-guided operation, Pre-recorded greeting, Announce-only mode, Memory usage guage, Audible message alert, Remote on/off, Auto interrupt, Memo recording, 2-way conversation recording, and Adjustable ring delay. An invaluable addition to any home or office at only...

$147.95

MODEL
TAM-1000
#1803901

BUSINESS PHONES

SONY.

SPEAKER PHONE w/16# MEMORY

From the leader in cordless phone technology comes a new line of feature phones. This unit has a crystal clear speakerphone, 16 number memory and more!

MODEL
IT-D10
#1699142

$47.95

SONY.

SPEAKERPHONE w/LCD DISPLAY

Have you ever made a mental note to call someone, and then forgot? Well, you won't have that problem anymore because this speakerphone comes equipped with an automatic call timer/reminder alarm! Now only...

MODEL
IT-D150
#1516889

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SONY.

2-LINE FEATURE PHONE w/ SPEAKERPHONE

Phones with 2-line operation are relatively common, but this phone offers a distinctive ring for each line! The LCD indicator will tell you the number dialed and the time. Now only..

MODEL
IT-D250
#1516904

$97.95

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SONY.

CORDLESS TELEPHONE WITH PAGING

This Sony cordless phone has 7 day standby, paging and an out-of-range warning system. This handy unit can sit on a table or hang on the wall! All this for only...

MODEL
SPP-57
#1720707

$57.95

SONY.

10 CHANNEL CORDLESS PHONE w/LIGHTED KEYPAD

This 10 channel cordless phone offers an out-of-range alert, extended 7-day battery standby power, 10 number speed dialing, and many other features for only...

MODEL
SPP-77
#1766990

$97.95

SONY.

10 CHANNEL CORDLESS SPEAKERPHONE & DIAL-OUT KEYPAD

From the newest generation of Sony cordless phones comes this model which offers base speakerphone and dial-out keypad giving you the option of answering or making calls from the base or handset, 2-way paging /intercom, 10 number memory, dual rechargeable battery pack, handset volume control, and much more for only...

MODEL
SPP-180
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$177.95

CORDLESS/ANSWERING MACHINE COMBO

SONY.

10 CHANNEL CORDLESS PHONE w/ ANSWERING MACHINE

This innovative product from Sony actually combines a ten channel cordless phone with a full-featured answering machine in one sleek package. Features include 256 security codes, 7 day stand-by, compander noise reduction and remote message retrieve.

MODEL
SPP-A20
#1714074

$147.95

SONY.

10 CHANNEL CORDLESS PHONE w/ ANSWERING MACHINE AND VOICE TIME DAY STAMP

This innovative product from Sony actually combines a ten channel cordless phone with a full-featured answering machine in one sleek package. Features include 256 security codes, 7 day stand-by, compander noise reduction and remote message retrieval.

MODEL
SPP-A40
#1720578

$177.95

SONY.

10 CHANNEL CORDLESS SPEAKER PHONE w/ ANSWERING MACHINE AND VOICE TIME DAY STAMP

This innovative product from Sony actually combines a ten channel cordless phone with a full-featured answering machine in one sleek package. Features include 256 security codes, 7 day stand-by, compander noise reduction and remote message retrieval. As an added bonus, the base unit is a speakerphone with adjustable volume.

MODEL
SPP-A60
#1720590

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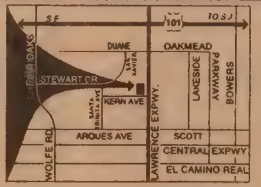

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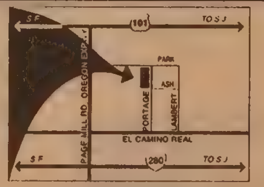

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- Multi-Lingual Display
- Signal Strength Indicator
- Scratchpad Memory
- Four NAM Capability

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LX12
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Limit One Per Family

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Model
CP6000
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MOTOROLA

TRANSPORTABLE HANDHELD CELLULAR TELEPHONE

Motorola's most popular Hand Held Phone has all the right features! This compact unit will allow you to talk for up to 90 minutes, keep 30 numbers in memory, and much more!

Service Activation Not Required
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Model
8000-HX
#1502549

MOTOROLA

CELLULAR FLIP PHONE

This premium value cellular phone from Motorola comes equipped with 30 number memory, LED display, call timer, signal strength meter, a battery with 75 minute total talk time, an overnight charger and a caring case for only....

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No Sales To Dealers Or Resellers
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Model
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ALPHA MICRO-TAC CELLULAR PHONE

If it's small and lightweight that your looking for, this is the cellular phone for you! With its 101 alpha numeric memory, a desktop charger, and standard battery. This technologicaly advanced cellular phone can be yours only...

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Model
DPC-950 BASE
#1744545

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MICRO TAC LITE CELLULAR PHONE

Weighing in at 7.7 ounces and measuring 11.6 cubic inches, this is one of the lightest and most advanced cellular telephones available. With 100 alpha numeric memory, are tractable antenna, standard battery, and desktop charger, you can receive state of the art performance and design for only...

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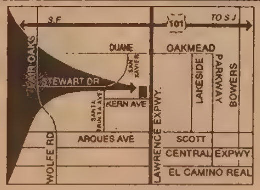
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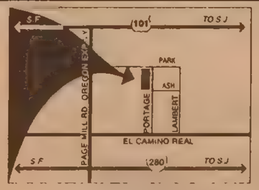
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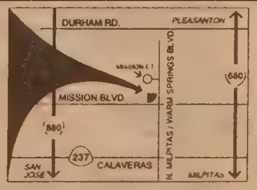
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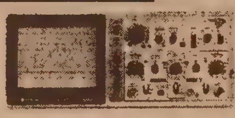

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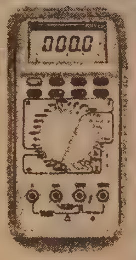

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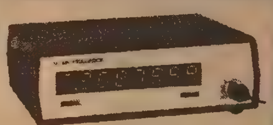

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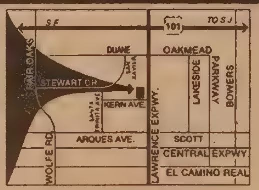

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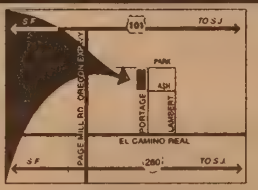

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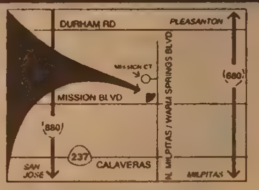

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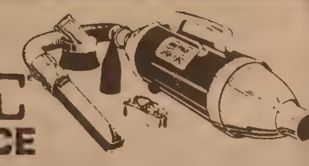

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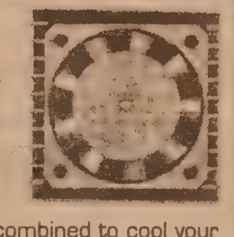

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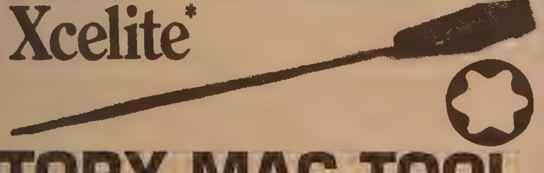

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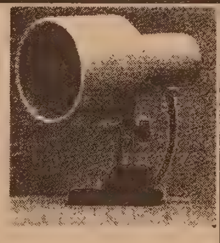

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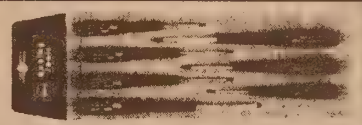

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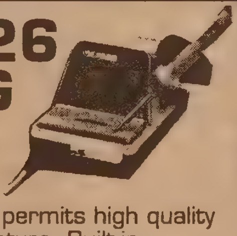

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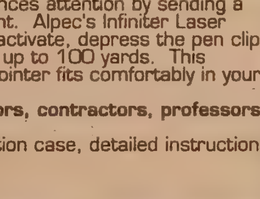
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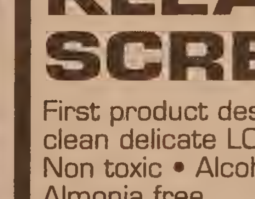
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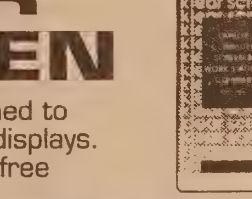
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Do-It-Yourself Motherboard Upgrades?

Everything You Always Wanted To Know About Motherboard Swaps, And A Few Things You'll Wish You Didn't.

BY ROBERT LAURISTON

In the course of upgrading my various systems over the years, I'd installed or replaced almost every component that makes up a PC: memory and math coprocessor chips; hard, floppy, tape, and CD-ROM drives; video, Ethernet, drive controller, I/O, modem, and sound boards; even a power supply.

The only major component I'd never installed was a motherboard. So, when circumstances recently demanded I upgrade to a 486, I figured I should round out my education by doing the motherboard swap myself. Since I had a lot of parts left over from earlier upgrades, I also planned to buy a new case and use the old motherboard to put together a PC for my sister-in-law.

What I learned along the way should be helpful to anyone considering a motherboard or system upgrade. First I'll go through the various options I had to consider in choosing my new motherboard, then describe the gory details of actually doing the upgrade.

CPU OPTIONS

Which CPU to buy is basically a question of how much power you need or are willing to pay for. If you're on a really tight budget, go for an AMD 40MHz 386DX, which is faster than any Intel 386 and roughly as fast as the more expensive Intel 25MHz 486SX. An extra $200 or so will get you a 33MHz 486DX, which is about 50% faster. For a further $250 or so you can get a top-of-the-line 66MHz 486DX2, which is almost twice as fast as a 486/33 at CPU-intensive tasks. Given the narrow price spread between the 33 and 66, the 50MHz models aren't cost-effective.

A couple of new 486 clones are also starting to show up in aftermarket motherboards. The 486DLC (designed by Cyrix, manufactured by Texas Instruments, and sold by both companies) fits a 386DX socket but is fully software-compatible with Intel 486s, since it uses the same microcode. (TI got rights to the code under an early-1980s technology-sharing agreement with Intel.) The 40MHz 486DLC's performance and price fall in between the 386/40 and 486/33.

IBM's clock-doubled 486SLC2 handles the 486 instruction set but uses different microcode. The chip is designed to fit a 386SX socket, which means the chip transfers data to and from system memory over a slow 16-bit data path. Early reports are that the chip's compatibility is fine, but the 50MHz version is slower than a 486/33.

One extra benefit of the 486DX and 486DX2 is that they have a floating-point math unit built in, giving a speed boost to certain operations in some programs, notably spreadsheets and CAD programs. You can add a math coprocessor to an AMD or Cyrix CPU for around $100 and $175 respectively, but doing so erodes most of their price advantage over a 486/33.

One last CPU issue is upgrade sockets, which you can use to upgrade your DX to a clock-doubled DX2, or (eventually, probably) your DX or DX2 to a clock-tripled DX3. The simplest approach is Intel's processor upgrade ("Overdrive") socket, which lets you just plug in the new CPU. Intel likes this method because you end up with two of its high-profit chips (one disabled) in one system. If you'd rather be able to remove the old CPU and pass it along to another system, get a motherboard with a ZIF (Zero Insertion Force) CPU socket, which makes it easy to swap chips. Even boards without such sockets are usually upgradable through chip swaps so long as the CPU isn't soldered in place, but without the proper tools it's easy to ruin the expensive chip.

Some motherboards include purported Pentium upgrade sockets, but they don't make much sense to me. If and when you're ready to upgrade to a 64-bit CPU, you won't want to slow it down by sticking it in a 32-bit motherboard.

MEMORY CHOICES

When selecting your new motherboard, get one that will take at least 32MB of RAM in standard SIMMs *on the motherboard* (that is, without having to install a memory expansion board). That may sound like overkill, but since it's easy to find boards with such capacity, what the heck?

Boards that use the older 30-pin (x 9) SIMMs, which come in 256K, 1MB, 4MB, and 16MB modules, typically have one or two banks of four SIMM sockets. All the sockets in a bank must be filled with SIMMs of equal capacity. With one bank you can install only 1, 4, 16, or (sometimes) 64MB total RAM, and any time you want to add memory you have to throw out all the SIMMs you've got already. With two banks, you can leave one empty, so whenever you like you can double your RAM by adding four more SIMMs. With two banks you can install 4, 8, 16, 32, or (sometimes) 128 or 256MB total RAM. Some boards let you put SIMMs of different capacities in each bank for even greater flexibility.

Boards that use the newer 72-pin (x 36) SIMMs are more flexible. You can get 72-pin SIMMs in 1, 2, 4, 8, 16, 32, and 64MB modules, which you can mix and match freely—though few motherboards support all those types. For example, the Micronics VL-Bus board lets you install from one to four SIMMs, which can be any combination of 4MB and 16MB modules you like.

If you already have some SIMMs you want to transfer to your new motherboard, make sure you choose a board that not only has the right kind of socket but can use the speed RAM you own. E.g., if you have 80ns RAM, don't try to use it in a board that requires faster 70ns or 60ns chips.

One thing I look for in a motherboard is SIMM sockets with metal clips. I've heard that there's a new kind of plastic clip that's more reliable, but having seen many of them snapped off in the past, I'm sticking with metal.

WHICH BUS DO I TAKE?

These days, aftermarket motherboards come with three different kinds of slots: Industry Standard Architecture (ISA, aka AT bus), the original 8MHz 16-bit AT slot; EISA, Enhanced ISA, a 32-bit slot that's backward-compatible with ISA boards; and VESA Local Bus (VLB), a slot that connects almost directly to the 486's internal bus. You can't

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Robert Lauriston is a free-lance writer whose work has appeared recently in Bayfood, CompuServe Magazine, Desktop Video World, the East Bay Express, Keyboard, NeXTworld, Nikkei PC, and PC World.

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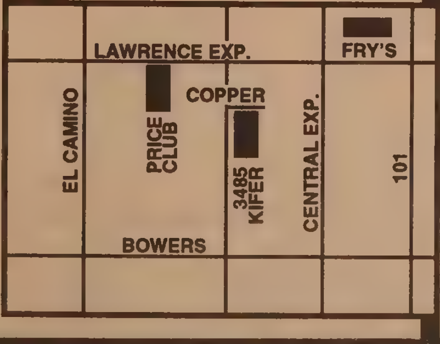

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Prices subject to change w/o notice, not responsible for typographic errors put more than two or three VLB slots on a motherboard, so those boards always include some ISA slots as well.

ISA's bandwidth (several megabytes per second) is perfectly adequate to handle most PC peripherals, so don't pay extra for EISA or VLB unless you really need them. There are three main reasons to buy a 32-bit bus. One is to use a 32-bit network adapter (generally those are installed only in a network servers). Another is to use a 32-bit SCSI or IDE adapter to keep up with a super-fast hard drive—many of the new gigabyte-range drives can outrun ISA, given the chance.

Finally, and most significant for most of us, those graphics applications that are held back by the ISA bottleneck can get a big performance boost from an EISA or VLB video board. In many cases an ISA graphics accelerator board like the ATI Ultra, Diamond Stealth, or Orchid Fahrenheit will give just as big an improvement, but *not* when you're loading large bitmaps (e.g., running slide shows, playing games, loading big scanned images, or playing back desktop video without a special compression board).

There's a bigger selection of 32-bit network and drive adapters for EISA, but more 32-bit video boards for VLB. Luckily, if you have a hard time deciding between EISA and VLB, there are several motherboards around that include ISA, EISA, and VLB slots.

Be warned that the VLB spec has been implemented a little differently by various manufacturers, so unlike ISA and EISA, there's no guarantee of plug-and-play compatibility. You can ensure compatibility by getting a set of boards from the same manufacturer, like Orchid's Superboard VLB, Fahrenheit VLB, and Super IDE. If you do mix and match, chances are things will work fine, but get a money-back guarantee that any VLB board you buy will work in your system, just in case.

EMBEDDED GOODIES

Some manufacturers take components that are commonly installed on expansion boards and build them right into their motherboards. For example, the HyQuest Peak boards include serial and parallel ports and an IDE adapter, and the Micronics Gemini offers the same, plus a floppy controller. While systems from big companies like Dell and Compaq often have embedded super-VGA adapters, I didn't come across any such motherboards in the aftermarket.

The advantages of these extra built-in capabilities are additional free slots and possibly a lower total cost. The drawback is that if one of the built-in components breaks, you may have to take the whole motherboard to the shop for expensive repairs instead of just replacing a cheap expansion board—but in most cases you should be able to just disable the built-in device and replace it with a plug-in.

THE ADVANTAGES OF EXTRA BUILT-IN CAPABILITIES ON THE MOTHERBOARD ARE ADDITIONAL FREE SLOTS AND POSSIBLY A LOWER TOTAL COST.

THE SHOPPING LIST

Having mulled over all the above options, I had a pretty definite idea of what I wanted on my new motherboard. Since I already had a 386/40 and found it annoyingly slow with a few programs (notably Photoshop and Windows NT), I wanted at least a 486/33, but given the relatively small extra cost of going all the way to the top I decided to go with a 486/66. I figure the money will be well spent if it lets me delay my next CPU upgrade for a year.

Since I had already upgraded to 16MB of RAM to run Windows NT, I wanted a motherboard that would take my four 36-pin, 70ns SIMMs. I also wanted eight SIMM sockets, so if and when it becomes necessary it'll be cheaper and easier to upgrade to 32MB.

Since I regularly run a variety of desktop video software and games that could really benefit from local bus video, I needed at least one VLB slot. Since I figure my next hard drive will be fast enough to hit the ISA-bus bottleneck, I wanted to reserve a second VLB slot for a 32-bit SCSI adapter.

Finally, I wanted my motherboard to have IDE, floppy, serial, and parallel ports built in. I've worked with a lot of brand-name systems with that design, and like the way it reduces clutter and cables inside the case.

I had the specs firmed up, but since I make most of my living writing about software I also needed to get a board that would be compatible with everything I might throw at it in the next couple of years. I was particularly concerned about compatibility with forthcoming 32-bit operating systems, particularly Windows NT, NextStep (its inability to run on a 386 was my most pressing motive for upgrading to a 486), and OS/2 2.x (which didn't run properly on my 386 clone).

One good way to ensure such compatibility is to buy a popular major-brand system, like a Dell, Compaq, or Gateway. Unfortunately, those companies don't sell motherboards, and their prices on stripped-down systems were a lot higher than similar hardware from local clone shops. With a little research I found that I could buy the same Micronics motherboard Gateway uses, which met almost all my criteria—except it wouldn't take my old SIMMs.

Giving up on my idea of built-in drive and I/O ports, I went with my dealer's recommendation: a US-built ISA-EISA-VLB combo board from a company I'd never heard of. To assauge my concerns about compatibility, the dealer gave me a written guarantee that I could return the board if it proved unable to run NT, NextStep, or OS/2 2.1.

IF AT FIRST YOU DON'T SUCCEED ...

Swapping the motherboards was surprisingly easy. First I did a full backup to tape, and checked to make sure the drive settings from my system's CMOS setup

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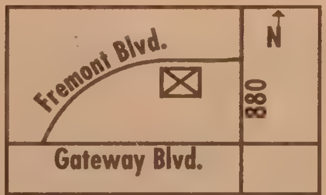

screen were in the hard disk's manual. Then I unplugged all the cables and removed all the cards from my old motherboard, making careful notes about how everything was connected. Removing the two screws that held the motherboard in place, I slid the board half an inch to disengage it from the case, and lifted the board out of the case.

To install the new motherboard, I simply reversed the process. The only glitch was that the new board had an overlapping pair of holes where one of its plastic supporting rods was supposed to snap in. It looked like the odd eight-shaped hole was intended to let you compensate for minor variations between cases, but the end result was that the spacer kept falling out. The board worked more or less okay without it, though it felt a bit flimsy when installing cards near the missing spacer.

Much to my surprise, after I'd reconnected everything and set the new board's setup to match the old one's, the system booted right up. I ran all kinds of benchmarks, diagnostic utilities, and burn-in tests to make sure there were no nasty surprises, but all my software and peripherals seemed to work fine.

Since I had a pair of Orchid VLB boards on hand, I decided to use them to test the new board's VLB slots. I swapped my IDE adapter for the VLB adapter, and everything worked fine, but when I swapped the video adapters the system hung during boot. After hours of trial and error I eventually determined it was a hardware problem: either Orchid board would work by itself, but there didn't seem to be any way to get the two to work together. The problem wasn't with the two boards, as they worked fine together when plugged into an Orchid motherboard.

TRY, TRY AGAIN ...

So I did the swap again, only backwards, put everything back where it had started, and and took the new motherboard back to my dealer's shop. (I don't mention the name of the board's manufacturer as in the meantime they've supposedly fixed the problem.) The dealer didn't trust my diagnosis, so I put the upgrade on hold for a few days while one of their techs duplicated my efforts.

Once satisfied that they couldn't resolve the problem, the dealer offered to replace the board with a similar one from Orchid. The only significant difference was that the Orchid board didn't have EISA slots, which was fine with me—I'd found it nearly impossible to get boards in and out of the first motherboard's combination VLB-EISA slots.

By this time my sister-in-law had decided she wanted a full tower case like mine, instead of the standard AT she uses at work, so I purchased a tower case and a couple of floppy drives. When I got the stuff home and took a good look at it, I decided to keep the new case for myself—I'd already filled up the four external bays in my old case, and the new one's six bays would give me room to install any new gadgets that come along.

Installing the new motherboard in the new case proved to be much harder than the swap had been. It's not that the task was fundamentally more difficult (in fact, it was identical except that none of Orchid's spacers fell out); the case's documentation was totally inadequate. The only way I could figure out what was supposed to connect to what was by tracing the wires. I got the power and reset switches and speaker connected, but had so much trouble with the turbo switch that I eventually gave up.

Then I transferred the hard drive, boards, and cables from my old system into the new one, hooked everything up, and flipped the power switch. The video board's ROM logo appeared on screen, the CMOS power-on self-test started running—and the system hung with a disk error message. Another few hours of trial-and-error troubleshooting and I had determined that neither of the new floppy drives would work, either in the new system or the old one.

... THEN GIVE UP

By this time, over a few weeks I'd spent four or five full days on my DIY upgrade, and was still using the exactly same system I'd started out with. I'd already learned as much about motherboard upgrades as I cared to, so I boxed up all the new hardware—486 motherboard, case, floppies—took them back to the dealer, and told them to put it together and call me when everything was working. Since I'd had so many problems the dealer didn't charge me anything, but if they had it would have been worth it.

ONE GOOD WAY TO ENSURE COMPATIBILITY IS TO BUY A POPULAR MAJOR-BRAND SYSTEM, LIKE A DELL, COMPAQ, OR GATEWAY.

When I got the assembled system back from the dealer, I once again swapped in the hard drive, boards, and cables from the old system, flipped the switch, and the system started just fine. I adjusted the CMOS settings to match my hard drive, rebooted, and DOS and Windows came up just like always—only faster. As before, I ran all the diagnostic tests I had around, and found no problems. I left a burn-in test running all night with similarly good results.

Knowing that most clone shops just leave things at their defaults, I checked the motherboard's advanced setup options to make sure I was getting the best performance. Sure enough, there were a few unnecessary wait states set here and there, so I toggled them off. Finally, since moving to a faster system occasionally causes problems for software or expansion boards, I methodically tested all my apps, but everything worked fine.

As I expected, attempting to do my own motherboard upgrade was educational, but unless you're particularly interested in the process, or have more free time than money, I can't recommend it. Next time around, I'll do what I ended up doing anyway: buy a bare-bones system and just swap components. ■

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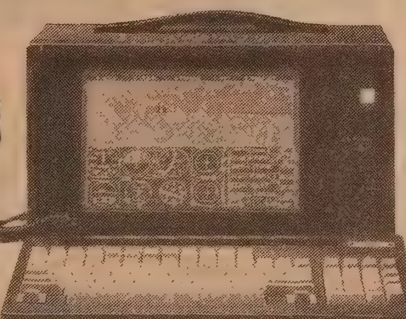

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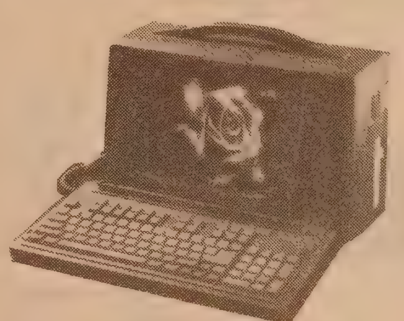

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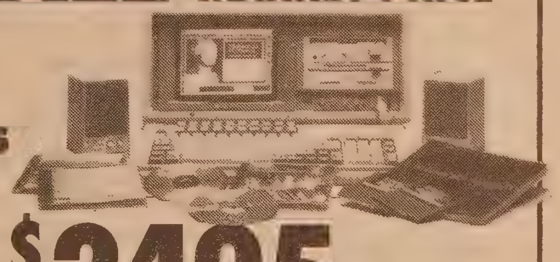

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Wireless Data Transmission: Practical, Reliable, But Not Cheap

A Look At Two New Systems

BY NORRIS PARKER SMITH

After protracted confusion and a great many overstuffed words, portable wireless transmission of email and other data is at last reaching the stage of practical, daily use for "Gottahavit" users—people who grab for a new thing because they are incurable technoromantics or need a particular gadget because of some unique requirement of their work.

During the past several weeks, I've experimented with two systems, each representing one of the main competing strategies for wireless data transmission—radio and cellular. Both products work well, are adequately if not outstandingly easy to use, have many strong points, and are available in the market right now. Both are also significantly more costly than ordinary plug-in-the-wall computer communication.

As is often the case with contrasting new technologies, each has advantages and disadvantages, and direct comparison is difficult. It's still a highly subjective decision, unlike comparisons of different PCs, where the base technology has stabilized, differences are relatively minor, and an evaluator can quantify her judgements.

A MARKET?

First, however, is there a market? Who are the Gottahavits?

The nonromantic users in this category include genuinely mobile workers of all kinds who operate out of their vehicles: delivery persons; real estate people and other field sales persons; appraisers; repair persons; mobile pet mowers; reporters on short deadlines; and any remaining doctors who still do house calls. Such people carried lots of change and used public phones in the past; now they're more likely to rely on cellular phones. The possibility of documenting the message in written form and sending off the text without having to waste time battering against the barriers of voice mail could be very appealing.

Within the next year, prices will come down, devices will become much more compact, and wireless data transmission will move into the "Gee, it might be useful" stage.

As the industry sees it, the emerging market consists of managers and technotypes who spend at least 65% of their working time in airports waiting for a connecting plane, in taxis, and in hotels too primitive to provide hookups for ordinary modeming. It remains to be seen whether these markets are as large as industry enthusiasts foresee. They may be right—after all, few observers expected the rapid growth in demand for laptops, palmtops, and the rest. Ditto for pagers. Wireless data transfer can be viewed as a linear extension to both trends.

For the foreseeable future, however, wireless data transmission will be inherently more costly (for service as well as equipment) than over-the-line communication. Its capabilities will also be constrained by the physical limitations of transmission through the air and the narrow portions of the spectrum likely to be made available by regulators.

THE PRESENT: I—VIKING EXPRESS

The Viking Express is a unified wireless modem/transceiver that communicates through radio systems devoted wholly to data transmission. It can be hooked up, using special software, with any DOS portable possessing 512K of memory and 250K of unencumbered hard disk space. A conventional modem is not needed.

It also operates with the Hewlett-Packard 95LX palmtop, which is available bundled with the modem and software for $995. The wireless modem alone is priced at $775. This system has been used extensively in Europe and has been available in the US since early this year.

The wireless modem, known as a Mobidem and utilizing technology known as Mobitex, is made by Ericsson-GE. It links up with a service named RAM Mobile which operates the radio transceiver base stations, similar to cellular technology but with cells of greater area. Messages are handled through RadioMail, a service that acts as translator and post office, managing the transfer from wireless to the Internet or other conventional data distribution system.

Users simply list the recipient's email address on the Internet or any other widely used public data transfer service, compose the message in a format specified by logical but somewhat error-intolerant RadioMail software, and execute a simple transmit command. Messages from the outside world are received at an Internet address specific to the portable device. RadioMail stores messages if the device is not turned on.

THE PRESENT: II—PACTEL

A new package put together by PacTel Mobile Services, available now in the Bay Area, employs a converter that acts as an intermediary between any modem and the ordinary cellular telephone system. The converter, which in effect delivers to the modem a dialtone that it can relate to as if it were coping with a familiar phone line, is priced at $299. For owners of DOS/Windows or Macintosh portables with no modem, no communications software, and no cellular phone, the total bill could run from $650 to $900 or more. Suitable portables can range from $1,000 or less up to $4,000 or more.

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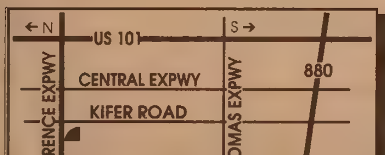

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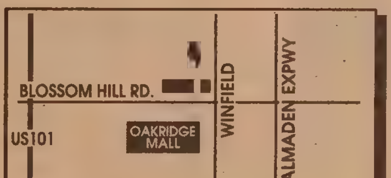

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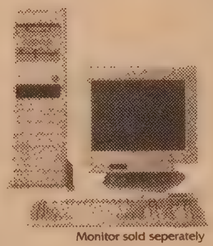
ALEXIS 340
386DX-40MHz
MINI TOWER SYSTEM


Monitor sold seperately

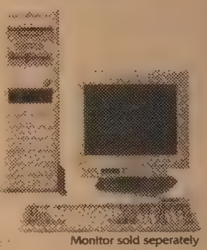
- AMD 386DX-40MHz
- 128K Cache (up to 256K)
- Mini Tower with 230W UL Power Supply
- TEAC Floppy Drive 1.2 or 1.44
- IDE Controller 2FD/2HD,
- I/O 2 Serial, 1Parallel, 1 Game Port.
- 101 Mitsumi Keyboard
- Clock & Calender
- 0MB RAM (up to 32MB)

$299

DOS 6.0 and Windows 3.1 ....add $88

CUSTOMIZE TO YOUR NEEDS...

ALEXIS 452VL
486SLC2-50MHz
VESA LOCAL BUS MED TOWER SYSTEM


Monitor sold seperately

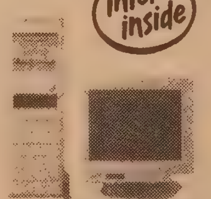
- ALARIS MotherBoard Manufactured by IBM
- IBM 486SLC 2/50MHz CPU
- 2 Local Bus 32-Bit Slots
- 7 16-bit slots, 1 8-bit slot
- 64K Cache (up to 128K)
- MEDIUM Tower with 235 UL Power Supply
- TEAC Floppy Drive 1.2 or 1.44
- IDE Controller 2FD/2HD,
- I/O 2 Serial, 1 Parallel,1 Game Port.
- 101 Mitsumi Keyboard
- Clock & Calendar
- 0 RAM (up to 16MB)

$499

DOS 6.0 and Windows 3.1 ....add $88

CUSTOMIZE TO YOUR NEEDS...

ALEXIS 433VL
486DX-33MHz
VESA LOCAL BUS MED TOWER SYSTEM


Monitor sold seperately

- Intel 486DX-33MHz
- ZIF Socket PENTIUM OverDrive Ready
- 2 Local Bus 32-Bit Slots
- 8 Slots 16bit
- 128K Cache (up to 256K)
- MEDIUM Tower with 235 UL Power Supply
- TEAC Floppy Drive 1.2 or 1.44
- IDE Controller 2FD/2HD,
- I/O 2 Serial, 1Parallel, 1 Game Port.
- 101 Mitsumi Keyboard
- Clock & Calendar
- 0 RAM (up to 32MB)

$599

DOS 6.0 and Windows 3.1 ....add $88

CUSTOMIZE TO YOUR NEEDS...

ALEXIS 466VL
486DX/2-66MHz
VESA LOCAL BUS MED TOWER SYSTEM

Monitor sold seperately

- Intel 486DX2-66MHz
- ZIF Socket PENTIUM OverDrive Ready
- 2 Local Bus 32-Bit Slots
- 8 Slots 16bit
- 128K Cache (up to 256K)
- MEDIUM Tower with 235 UL Power Supply
- TEAC Floppy Drive 1.2 or 1.44
- IDE Controller 2FD/2HD,
- I/O 2 Serial, 1Parallel, 1 Game Port.
- 101 Mitsumi Keyboard
- Clock & Calendar
- 0 RAM (up to 32MB)

$849

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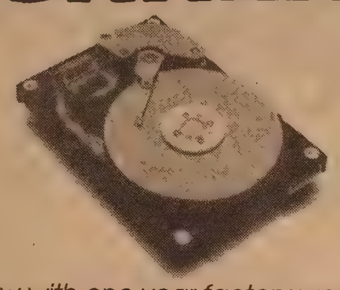

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IDE

CAPACITY	M/N	CACHE	SPEED	SIZE	PRICE
80MB	CP30084	64K	19ms	3.5X1"	$164
120MB	CP30104H	32K	19ms	3.5X1"	$169
170MB	CP30174E	64K	17ms	3.5X1"	$189
212MB	CP30204	256K	12ms	3.5X1"	$229
250MB	CP30254	64K	14ms	3.5"	$259
540MB	CP30544	256K	<12ms	3.5X1"	$669

SCSI

CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
80MB	CP30080	32K	19ms	3.5X1"	$219	$329
170MB	CP30170	64K	17ms	3.5X1"	$249	$359
212MB	CP30200	256K	12ms	3.5X1"	$289	$419
540MB	CP30540	256K	12ms	3.5X1"	$699	$849

ALPS

1 Year Warranty

IDE

CAPACITY	SPEED	SIZE	PRICE
105MB	13	3.5X1"	$155

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SCSI-II / ESDI*

CAPACITY	M/N	RPM	SIZE	TYPE	NTERNAL	EXTERNAL
1.1GB	DK315C-11	5400	3.5"	*FAST* SCSI-2	$1699	$1799
1.4GB	DK315C-14	5400	3.5"	*FAST* SCSI-2	$2099	$2199
1.5GB	DK516-15*	3600	FH	ESDI	$2199	N/A
1.6GB	DK516C-16	3600	FH	SCSI-2	$2199	$2399
3.7GB	DK517-37	5400	FH	*FAST* SCSI-2	$3999	$4199

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877MB SCSI-II
3.5"
12ms
512K Cache

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External $1029

1.2GB SCSI-II
Formatted Capacity
3.5"
12ms
512K Cache

$999
External $1119

SAMSUNG
Electronics

2 Year Warranty

IDE

CAPACITY	SPEED	SIZE	PRICE
120MB	17	3.5X1"	$165
250MB	15	3.5X1"	$269

DEC
Digital Equipment Corporation

5-YEAR WARRANTY

High End, High Capacity

***Fast* SCSI-II**

CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
1.0GB	3105S	3.5"	5400	9.5ms	$1199	$1329
1.6GB	3160S	3.5"	5400	9.5ms	$1599	$1739
2.0GB	5200S	FH	3600	12.5ms	$1899	$2099
3.5GB	5350S	FH	5400	11.5ms	$3599	$3799

HEWLETT PACKARD

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FAST SCSI-II

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- 6400 RPM
- 500,000 MTBF
- 5-Yr Warranty
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- up to 20Megabytes/sec (synchronous)

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EXTERNAL.... $2419

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SCSI

CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
1.2GB	C2247	256K	10ms	3.5"	$1069	$1199
1.2GB	C97558	256K	13ms	FH	$1399	$1599
1.8GB	C3009	256K	11.5ms	FH	$1999	$2199
2.0GB	C3010	256K	11.5ms	FH	$2399	$2599

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EXTENDED WARRANTY

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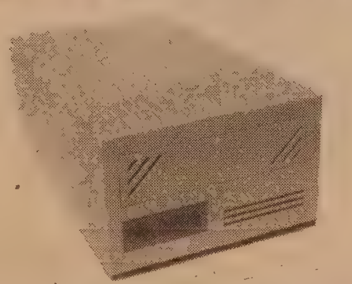

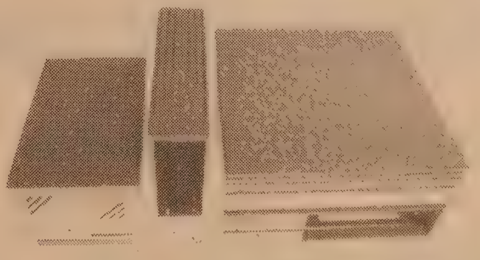

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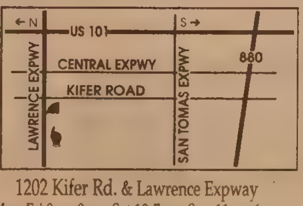

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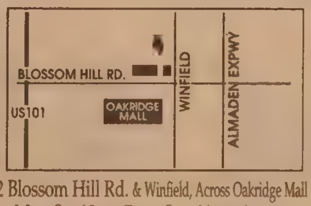

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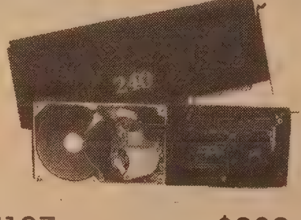
160MB	GO160	32K	16ms		$429
85MB	ELS85A	32K	17ms	3.5X1"	$175
127MB	ELS127A	32K	17ms	3.5X1"	$185
170MB	ELS170A	32K	17ms	3.5X1"	$205
240MB	LPS240A	256K	*Fast*	3.5X1"	$265
525MB	LPS525AT	256K	*FAST*	3.5X1"	$659

SCSI

CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
120MB	GO120S	32K	*Fast*	FOR MAC POWERBOOKS	$299	N/A
160MB	GO160S	32K	16ms		$449	N/A
85MB	ELS85S	32K	17ms	3.5X1"	$179	$299
127MB	ELS127S	32K	17ms	3.5X1"	$209	$339
170MB	ELS170S	32K	17ms	3.5X1"	$229	$359
240MB	**LPS240S**	**256K**	***Fast***	**3.5X1"**	**$269**	**$379**
525MB	LPS525	256K	*Fast*	3.5"X1"	$659	$859
700MB	PD700	256K	<10ms	3.5"	$789	$1019
1.0GB	PD1050S	512K	<10ms	3.5"	$979	$1229
1.2GB	PD1225	512K	<10ms	3.5"	$1089	$1299

HARD CARDS



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127MB	HARD CARD	EZ127	$289
170MB	HARD CARD	EZ170	$329
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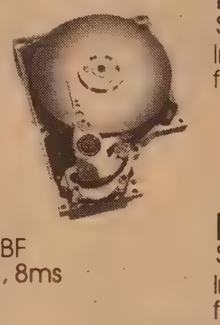

- 3.5"
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BARRACUDA II / 2.1GB
ST12550N
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IDE

CAPACITY	M/N	CACHE	SPEED	SIZE	PRICE
42MB	ST351A/X	32K	28ms	3.5X1"	$129
107MB	ST3120A	32K	15ms	3.5X1"	$175
130MB	ST3144A	32K	16ms	3.5X1"	$189
245MB	ST3283A	128K	12ms	3.5X1"	$309
340MB	ST3390A	256K	*Fast*	3.5X1"	$399

SCSI

CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
245MB	ST3283N	128K	12ms	3.5X1"	$349	$459
450MB	ST3550N	256K	12ms	3.5X1"	$639	$749
525MB	ST3610N	256K	12ms	3.5X1"	$799	$879
1.0GB	ST11200N	256K	12ms	3.5"	$999	$1109
1.0GB	ST41200N	256K	15ms	FH	$1049	$1199
1.3GB	ELITE-I	256	11ms	FH	$1749	$1949
1.4GB	ST41651	256K	15ms	FH	$1279	$1439
1.7GB	ST11900N	256K	9ms	3.5"	$1699	$1829
1.9GB	ST42100N	256K	14ms	FH	$1649	$1859
2.1GB	ST12400N	256K	10ms	3.5"	-	$2129
2.4GB	ELITE-II	256K	11ms	FH	$2199	$2399
2.9GB	ELITE-III	512K	11ms	FH	$2899	$3099
2.9GB	ST43401N	Fast-Wide SCSI-II			$2999	$3199

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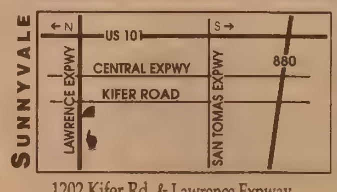

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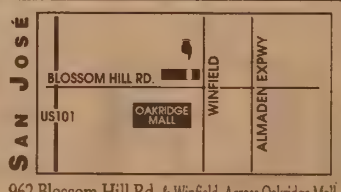

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1.2GB *(FORMATTED CAPACITY)*

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- ▶ 256K Cache
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$1239

IDE

	MODEL	CACHE	SPEED	SIZE	INTERNAL
128MB	25128A	32K	14ms	for Notebooks	.....$259
131MB	7131A	64K	14ms	3.5X1"	.....$179
213MB	7213A	64K	15ms	3.5X1"	.....$219
245MB	7245A	64K	15ms	3.5"	.......$229
345MB	7345A	64K	14ms	3.5X1"	.....$295
540MB	MXT-540A	256K	8.5ms	3.5X1"	.....$889

SCSI

	MODEL	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
120MB	7120S	64K	15ms	3.5X1"	$199	......$309
213MB	7213S	64K	15ms	3.5X1"	$269	......$379
345MB	7345S	64K	14ms	3.5X1"	$439	......$549
540MB	**MXT-540S**	**256K**	**8.5ms**	**3.5X1"**	**$849**	**......$959**
1.2GB	**MXT-1240S**	**256K**	**8.5ms**	**3.5"**	**$1239**	**...$1349**
1.2GB	PO-12S	256K	13ms	FH	$979	....$1179
1.7GB	P1-17S	256K	13ms	FH	$1239	...$1439

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520MB 3.5"

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M2624T

SCSI.. $669
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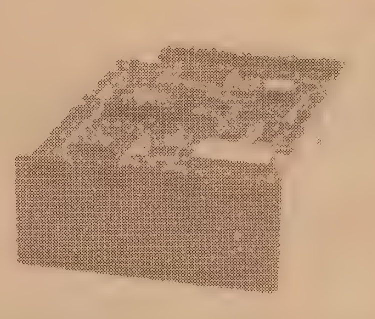

IDE

	MODEL	CACHE	SPEED	SIZE	INTERNAL
520MB	M2624T	64K	12ms	3.5"	.....$679

SCSI

	MODEL	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
425MB	***M2623SA***	***240K***	***11ms***	***3.5"***	***...$549***	***....$759***
520MB	M2624FA	240K	11ms	3.5"	....$669	....$789
1.2GB	M2694SA	256K	10ms	3.5"	...$1079	.$1209
1.2GB	M2266SA	256K	14ms	FH	....$1079	.$1279
2.0GB	M2652SA	256K	11ms	FH	....$1899	.$2099
2.4GB	M2654SA	256K	12ms	FH	....$1949	.$2149

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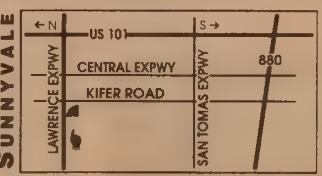

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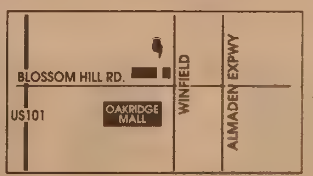

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- 3.5"
- 5400
- 10ms

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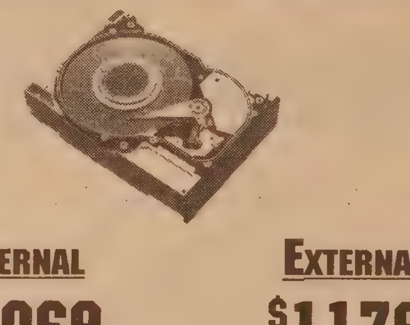

INTERNAL	EXTERNAL
$1069	$1179

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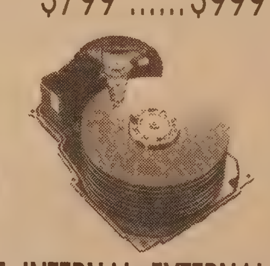
1.7GB MC2217 3.5" Fast SCSI-II *Internal* $1999 *External* $2199

1500 Series Disk Drives/SCSI Interface

CAPACITY	M/N	RPM	SPEED	SIZE	INTERNAL	EXTERNAL
1.2GB	MC1598	3600	15ms	FH	$999	$1199
1.5GB	**MC1528**	**3600**	**15ms**	**FH**	**$999 ....**	**$1199**
2.0GB	**MC1548**	**3600**	**14ms**	**FH**	**$1499 ...**	**$1699**

1600 Series/SCSI Interface

CAPACITY	M/N	RPM	SPEED	SIZE	INTERNAL	EXTERNAL
340MB	MC1684	3600	14ms	HH	$999	$1109
670MB	MC1624	3600	14ms	HH	$799	$999



1900 Series Disk Drives/SCSI Interface

CAPACITY	M/N	RPM	SPEED	SIZE	INTERNAL	EXTERNAL
1.6GB	MC1908	5400	11ms	FH	$1699 ...	$1899
2.4GB	MC1924	5400	11ms	FH	$2279 ...	$2499
3.6GB	MC1936	5400	11ms	FH	$2849 ...	$3049

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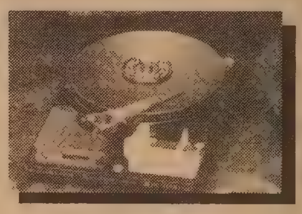

170MB

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- 3.5"X1"
- WD1170
- 32K CACHE
- <15MS SEEK TIME
- 2-YR WARRANTY

$229

212MB

Caviar Series

- 3.5"X1"
- WD2200
- 64K CACHE
- 12MS SEEK TIME
- 2-YR WARRANTY

$209

250MB

Caviar Series

- 3.5"X1"
- WD2250
- 32K CACHE
- 14MS SEEK TIME
- 2-YR WARRANTY

$239

340MB

Caviar Series

- 3.5"X1"
- WD2340
- 32K CACHE
- 12MS SEEK TIME
- 3-YR WARRANTY

$295

420MB

Caviar Series

NEW!

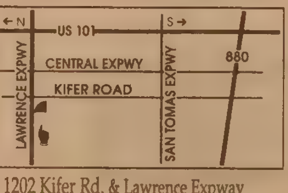
- 3.5"X1"
- WD2420
- 32K CACHE
- QUICK SEEK TIME
- 3-YR WARRANTY

$459

Your Hard Drive, Multimedia, & System Super Source

NCA Computer Products

SUNNYVALE



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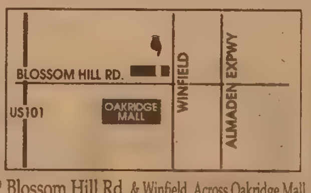
SAN JOSÉ



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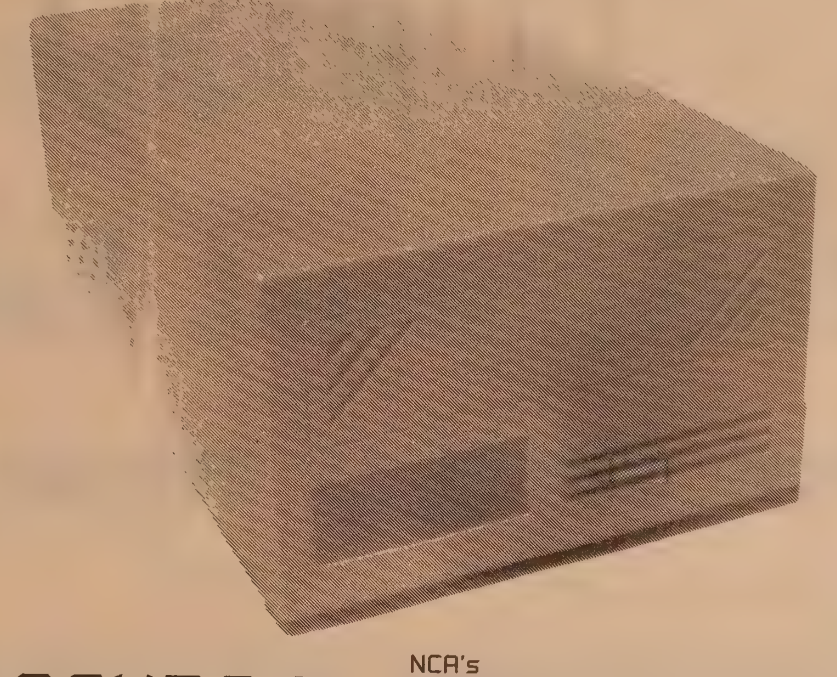
EXTERNAL SCSI SUPER SOURCE

NCA's HIGH QUALITY EXTERNAL SCSI SUB-SYSTEMS

for MAC, SUN, NeXT,
and IBM Compatibles



- High Quality External Cases.
- Sound Free Fan
- Top Manufacturers Quality SCSI Devices
- Universal Power Supply 110/220V
- 2 External Centronics Connectors
- Selectable SCSI ID.
- External Termination / includes a terminator
- SCSI Cable (Cent50-Cent50 or Cent50 to DB25)
- Power Cable
- Fully Tested and Approved
- Mac Formatting and Caching Software (upon request)
- External PC Kits Available

NCA's
BARRACUDA I

Half Height Enclosures
3.5" Fixed SCSI Disk Drives

SIZE Formatted	MAKE	SPEED	WARRANTY	PRICE
85Mb	Quantum	17ms	2Yr	$299
120Mb	Maxtor	15ms	1Yr	$309
127Mb	Quantum	17ms	2Yr	$339
170Mb	Quantum	17ms	2Yr	$359
212Mb	Conner	12ms	1Yr	$419
213Mb	Maxtor	15ms	1Yr	$379
240Mb	Qauntum	Fast	2Yr	$399
240Mb	Seagate	12ms	1Yr	$459
340Mb	Maxtor	15ms	1Yr	$549
425Mb	Seagate	10ms	1Yr	$749
425Mb	Fujitsu	12ms	5Yr	$759
520Mb	Fujitsu	12ms	5Yr	$789
525Mb	Qauntum	Fast	2Yr	$859
535Mb	Seagate	10ms	1Yr	$979
540Mb	Maxtor	8.5ms	2Yr	$959
540Mb	Conner	12ms	1Yr	$849
877Mb	Toshiba	12ms	5Yr	$1029
1.0GB	Micropolis	10ms	5Yr	$1199
1.0Gb	Seagate	10ms	5Yr	$1199
1.0Gb	HP	10ms	5Yr	$1199
1.0Gb	DEC	9ms	5Yr	$1329
1.0Gb	Fujitsu	10ms	5Yr	$1229
1.2Gb	Qauntum	12ms	5Yr	$1299
1.2Gb	Maxtor	8.5ms	3Yr	$1349
1.2Gb	Toshiba	12ms	5Yr	$1229
1.6Gb	DEC	9ms	5Yr	$1739
1.6Gb	Seagate	8ms	5Yr	$2039
1.7Gb	Micropolis	10ms	5Yr	$2199
2.0Gb	Seagate	10ms	5Yr	$2129
2.1Gb	Seagate	8ms	5Yr	$2739

NCAs
BARRACUDA II

Full Height Enclosures
FH Fixed SCSI Disk Drives

SIZE Formatted	MAKE	SPEED	WARRANTY	PRICE
1.0Gb	Micropolis	14ms	5Yr	$1399
1.0Gb	Seagate	14ms	1Yr	$1239
1.0Gb	Maxtor	13ms	2Yr	$1179
1.0Gb	Fujitsu	14ms	5Yr	$1279
1.3Gb	Micropolis	14ms	5Yr	$1599
1.4Gb	Micropolis	11ms	5Yr	$2049
1.4Gb	Seagate	11ms	1Yr	$1999
1.4Gb	Seagate	14ms	1Yr	$1599
1.5Gb	Maxtor	13ms	2Yr	$1439
1.7Gb	Micropolis	14ms	5Yr	$1699
1.7Gb	Fujitsu	11ms	5Yr	$2099
1.7Gb	HP	11.5ms	5Yr	$2199
1.8Gb	Seagate	14ms	5Yr	$1959
2.0Gb	Seagate	11ms	5Yr	$2129
2.0Gb	Micropolis	11ms	5Yr	$2499
2.0Gb	Fujitsu	11ms	5Yr	$2299
2.0Gb	HP	11.5ms	5Yr	$2599
2.0Gb	DEC	12ms	5Yr	$2099
2.8Gb	Micropolis	11ms	5Yr	$3049
2.8Gb	Seagate	11ms	5Yr	$3099
3.5Gb	DEC	11.5ms	5Yr	$3799

Combo SCSI Devices
Custom Configurations
Available

NCA's
BARRACUDA III

External
Non-Fixed SCSI Devices

SCSI BACKUP:

SIZE(UPTO)	MAKE	MODEL	TYPE	PRICE
250Mb	Archive	2150S	1/4"	$499
525Mb	Archive	2525S	1/4"	$699
1.3Gb	Archive	2750S	1/4"	$899
2.0Gb	Archive	4540NT	4mm	$1199
4.0Gb	Archive	4324NT	4mm	$1299
8.0Gb	Archive	4542NT	4mm	$1299
2.2Gb	Exabyte	EXB8200	8mm	$1849
2.2Gb	Exabyte	EXB8205	8mm	$1849
5.0Gb	Exabyte	EXB8500	8mm	$2849
5.0Gb	Exabyte	EXB8505	8mm	$2799
2.0Gb	HP	35470	4mm	$1199
8.0Gb	HP	35480	4mm	$1249
2.0GB	WangDat	3100	4mm	$1249
8.0Gb	WangDat	3200	4mm	$1299

MAC Backup Software	*add $ 79*
NovaBack for PC	*add $ 99*
NovaNet for 100+users	*add$499*

EXTERNAL SCSI CD ROMs:

MAKE	MODEL	ACCESS	TRANSFER	PRICE
TOSHIBA	3401B	200ms	330KB	$539
NEC	84-1	265ms	330Kb	$569
PANASONIC	532	290ms	200Kb	$459
CHINON	535	280ms	300Kb	$499
TEXEL	5024	265ms	300Kb	$449
PIONEER	604X	300ms	612Kb	$1249

Also Available:
External OPTICALS & Removable Cartridges by:
Syquest, Bernoulli, Maxoptix, Fujitsu, Ricoh
(See Page 20)

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OPTICALS SUPER SOURCE

FUJITSU®

Optical Advantage

- 128MB Removable Optical Diskette
- Rewritable
- 3.5" Diskette Size of Floppy
- Unlimited Storage
- Ideal For Data Mobility
- Fast Access time & Data Transfer
- ISO Standard

128MB REWRITABLE, REMOVABLE OPTICAL DRIVES

INTERNAL 128MBYTE, 3.5" REWRITABLE OPTICAL

- Bare Optical Drive
- 2511A
- Low Profile, only 1"
- Fast 30ms Seek Time
- 3600RPM
- 256K Cache

$839

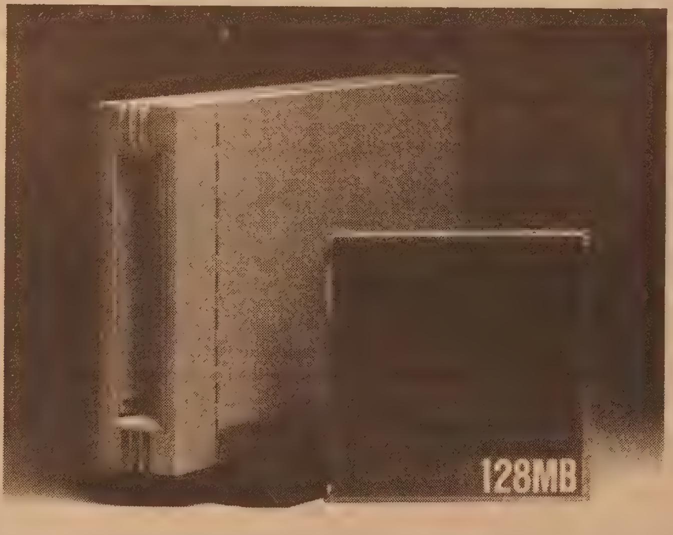
Cartridge sold separately

INTRODUCING

DynaMO™ 128

EXTERNAL SCSI 128MBYTE, 3.5" REWRITABLE OPTICAL

FOR MAC OR IBM



- External Optical Drive
- Using 2511A Internal
- Includes 1 Cartridge
- Fast 30ms Seek Time
- 3600RPM
- 256K Cache
- Software for MAC (free upon request)

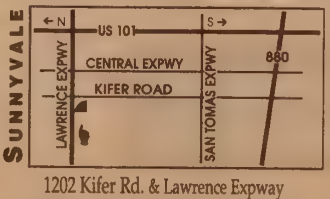
$999

OPTICAL CARTRIDGES

CAPACITY	SINGLE	5-PACK
128MB Fujitsu	$49	$239
128MB Maxell	$42	$199

Your Hard Drive, Multimedia, & System Super Source

NCA Computer Products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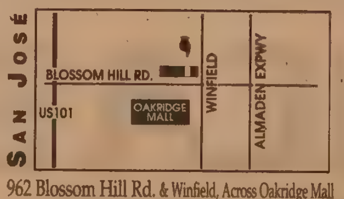
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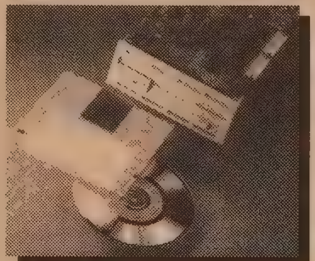
REMOVABLE SUPER SOURCE

OPTICALS

TEAC

TEAC 128MBYTE, 3.5" REWRITABLE OPTICAL



- ▶ 3000 RPM
- ▶ 3.5" Half Height
- ▶ 128K Cache
- ▶ 42ms Seek Time
- ▶ SCSI-II

INTERNAL **$759**

EXTERNAL WITH CARTRIDGE **$899**

RICOH

RICOH 128MBYTE, 3.5" REWRITABLE OPTICAL

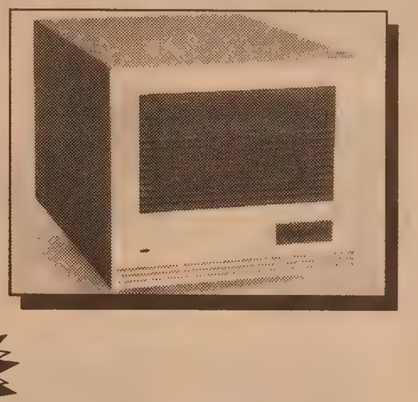
- ▶ Shielded case
- ▶ 3000 RPM
- ▶ 256K Cache
- ▶ Approx. 40ms seek time
- ▶ SCSI-II

INTERNAL **$799**

EXTERNAL WITH CARTRIDGE **$949**

Multifunction Magento-Optical Disk Drive for 1-Gbyte and 650-Mbyte Rewritable and WORM Disk Cartridges, With up to 4-Mbytes Read/Write cache

Maxoptix™



- ▶ Unlimited Data Storage
- ▶ External SCSI Subsystem
- ▶ One year factory warranty
- ▶ 25-Year life of Glass Media
- ▶ Embedded SCSI/SCSI-2
- ▶ Data Transfer of up to 13.2Mbit/Sec.
- ▶ Ultimate Back-up for NOVEL (Ready-to-Boot Backup)

1GB CART.
glass/poly
$199

TAHITI IIM - Multifunction

- ▶ 1MB Read/WriteCache
- ▶ External SCSI
- ▶ 35ms

$2799

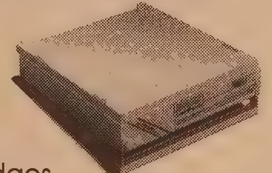
TAHITI IIM - Multifunction

- ▶ 4MB Read/Write Cache
- ▶ External SCSI
- ▶ 35ms

$2999

REMOVABLES

BERNOULLI



- ▶ SCSI Interface
- ▶ Removable Cartridges
- ▶ 18ms Access time
- ▶ 150MB, 105MB, 65MB, 35MB Capacity

BERNOULLI MULTI-DISK™ 150

PC Version

- ▶ Ext. Multi-Disk 150™
- ▶ 150MB Cartridge
- ▶ Controller & S/w

$799

MAC Transportable

- ▶ Ext. Multi-Disk 150™
- ▶ 150MB Cartridge
- ▶ MAC Software

$799

90MB BERNOULLI REMOVABLE
PC VERSION ......$689 MAC Transportable ..$529

BERNOULLI CARTRIDGES	SINGLE	3-PACK
65MB	$79	$219
90MB	$159	$439
105MB	$109	$289
150MB	$159	$429

FLOPTICALS

IOMEGA®

21MB Floptical Drive

floptical®

MAC Version

INCLUDES:

- ▶ External 3.5" 21MB Floptical
- ▶ One Floptical Media
- ▶ Cables
- ▶ Software for MAC

$399

21MB MEDIA BY IOMEGA LASER ETCHED
SINGLE ......$19.99 5-PACK......$89.99

PC Version

INCLUDES:

- ▶ IOMEGA 21MB 3.5" Floptical
- ▶ One Floptical Media
- ▶ Host adapter SCSI 8-bit
- ▶ Cables
- ▶ Software for PC

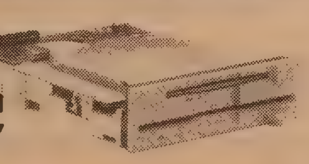
INTERNAL **$369**

EXTERNAL **$429**

21MB MEDIA BY IOMEGA LASER ETCHED
SINGLE ......$19.99 5-PACK......$89.99

FLOPPY DRIVES

TEAC



FLOPPY DRIVES

DRIVE FORMAT	PRICE
1.2MB	$57
1.44MB with 5.25" Kit	$55
1.2/1.44MB Dual Floppy	$149

TOSHIBA

2.88MB TOSHIBA Floppy Drive $59.00

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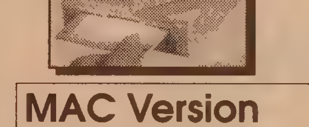

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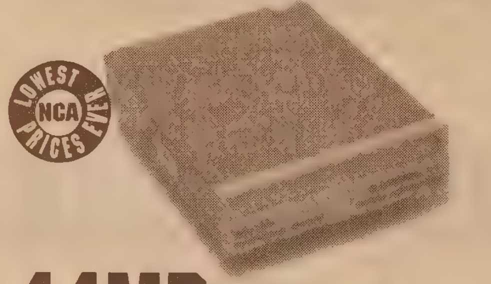
SyQuest TECHNOLOGY SUPER SOURCE

Incredible Sale

SyQuest TECHNOLOGY

- Removable Drive Cartridge, 44MB, 88MB, & 105MB ◀
- 20ms Access speed (14ms on 105MB) ◀
- Unlimited Storage ◀
- SCSI Embedded ◀
- For MAC or IBM ◀
- 2-Yr Warranty ◀

BARE DRIVES


LOWEST NCA PRICES EVER

44MB

- SQ555
- SCSI
- 20ms
- 5.25" HH

$249

88MB

- SQ5110
- SCSI
- 20ms
- 5.25" HH
- Reads 44MB
- Reads/Writes to 88MB

$309

88MB C

- SQ5110C
- SCSI
- 20ms
- 5.25" HH
- Reads/Writes to 44MB &88MB

$369

EXTERNAL DRIVES

INCLUDES CARTRIDGE
LOWEST NCA PRICES EVER

44MB

- EXTERNAL DRIVE
- 44MB CARTRIDGE
- STANDARD POWER CORD
- EXTERNAL CABLE
- INSTALLATION SOFTWARE (for Mac)
- PC Software included w/controller purchase

$389

88MB

- EXTERNAL DRIVE
- 88MB CARTRIDGE
- STANDARD POWER CORD
- EXTERNAL CABLE
- INSTALLATION SOFTWARE (for Mac)
- PC Software included w/controller purchase

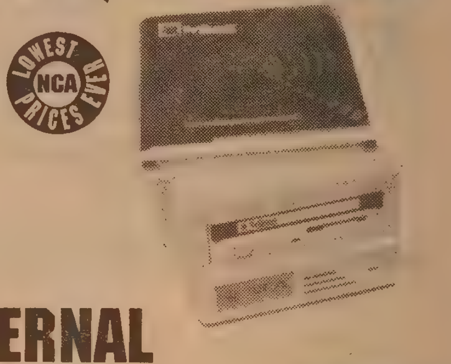
$469

88MB C

- EXTERNAL DRIVE
- 88MB CARTRIDGE
- STANDARD POWER CORD
- EXTERNAL CABLE
- INSTALLATION SOFTWARE (for Mac)
- PC Software included w/controller purchase

$499

105MB, 3.5" DRIVE


LOWEST NCA PRICES EVER

INTERNAL

- SQ3105
- 14ms
- SCSI
- INSTALLATION SOFTWARE (for Mac)

$469

105MB INT. IDE $389

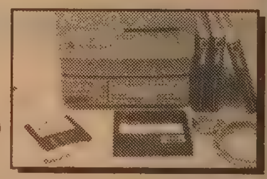
EXTERNAL WITH CARTRIDGE

- EXTERNAL SCSI DRIVE
- 14ms
- STANDARD POWER CORD
- EXTERNAL CABLE
- INSTALLATION SOFTWARE (for Mac)

$629

FOR ALL MACINTOSH MODELS*

COMPLETE, PREFORMATTED, PLUG & PLAY EXTERNAL KITS.

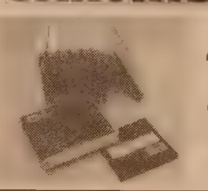


- EXTERNAL SYQUEST DRIVE
- CARTRIDGE
- CABLES (50C-Mac or 50C-50C)
- STANDARD POWER CORD
- FORMATTING SOFTWARE ($39 Value)

*Macintosh Plus or later

44MB SQ555	$389
88MB SQ5110	$469
88MB C SQ5110C	$499
105MB SQ3105	$629

CARTRIDGES



44MB	$63	$309
88MB	$95	$459
105MB	$85	$399

8-BIT CONTROLLER & SOFTWARE............$59

16-BIT CONTROLLER & SOFTWARE............$149

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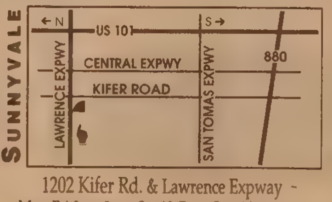
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TAPE BACK-UP SUPER SOURCE

ARCHIVE

for IBM Compatibles, MAC, SUN, & NeXT

The BEST name in SCSI Back-up Drives

SCSI

LOWEST NCA PRICES EVER

VIPER

2150
- 250MB VIPER
- 6MB/MIN.

INT.	EXT.
$379	$499

2525
- 525MB VIPER
- 6MB/MIN.

INT.	EXT.
$599	$699

ANACONDA

- 36MB/MIN
- SCSI-2
- 1/4" TAPE UNIT

1.3GB 2750		2.0GB 2800	
INTERNAL	$799	INTERNAL	$1099
EXTERNAL	$899	EXTERNAL	$1199

PYTHON

4324 TURBO PYTHON
- 4GB DAT 4mm
- 1MB Cache Buffer

INT.	EXT.
$1199	$1299

4320NT
- 2.0GB DAT 4mm
- 11MB/MIN.

INT.	EXT.
$1099	$1199

4542NT
- 4-8GB DAT 4mm
- 11MB/MIN.

INT.	EXT.
$1199	$1299

EXABYTE®

SUN compatible 8mm SCSI back up system

SCSI-8mm/4mm

CAPACITY	MODEL	SIZE	INT.	EXT.
2.2GB 8mm	EXB-8200	FH	$1499	$1749
2.2GB 8mm	EXB8205	HH	$1589	$1849
5.0GB 8mm	EXB-8500	FH	$2399	$2649
5.0GB 8mm	EXB-8505	HH	$2499	$2799
2.0GB 4mm	EXB-4200	3.5"	$999	$1149
5.0Gb 4mm	EXB-4200c	3.5"	$1099	$1249

HEWLETT PACKARD

Setting the Standards

SCSI 4mm DAT

CAPACITY	MODEL	INT.	EXT.
2.0GB	35470 DAT	$1099	$1199
4-8GB	35480 DAT	$1149	$1299

WangDAT™

SCSI QIC-Format

CAPACITY	MODEL/TYPE	INT.	EXT.
250MB	5150 1/4" SCSI	$399	$499
525MB	5525 1/4" SCSI	$599	$699

SCSI 4mm DAT

CAPACITY	MODEL/TYPE	INT.	EXT.
2.0GB	3100 DAT	$1089	$1189
4-8GB	3200 DAT	$1149	$1249

TAPE CARTRIDGES

Refer to page 21 of this Guide

COLORADO MEMORY SYSTEMS INC.

Uses 2120 Tapes

RUNS OFF FLOPPY PORT

CAPACITY	MODEL/TYPE	INT.
120MB	DJ10/IBM COMPATIBLE	$139
250MB	DJ20/IBM COMPATIBLE	$189

EXTERNAL KIT WITH CARD AND CABLES KE-10	$109
EXTERNAL TAPE PORT AB-11	$39
FC-10 TAPE CONTROLLER, WITH CABLES	$89
FC-15 HIGH PERFORMANCE 16-BIT CONTROLLER	$189

SUMMIT™

MEMORY SYSTEMS INC.

WITH CENTRAL POINT BACKUP SOFTWARE

RUNS OFF FLOPPY PORT

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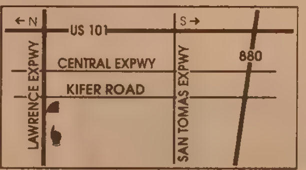

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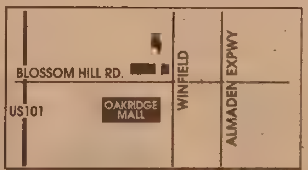

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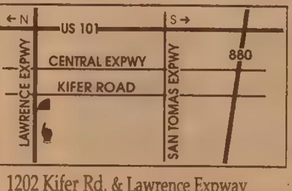

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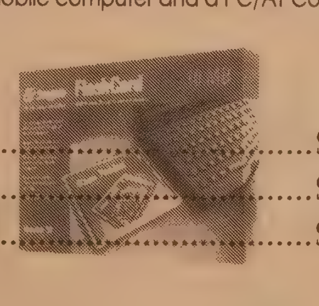
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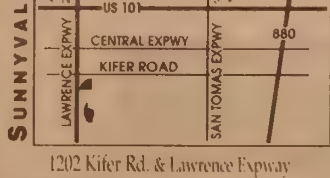
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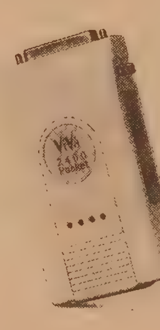

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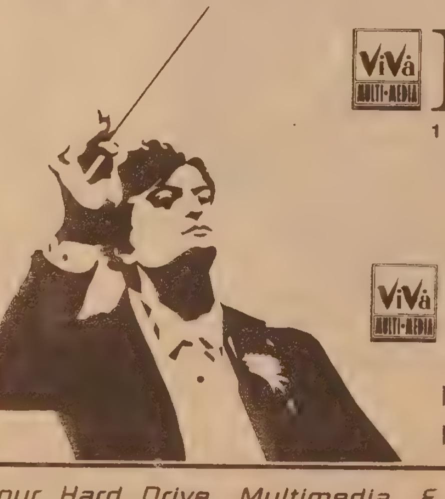

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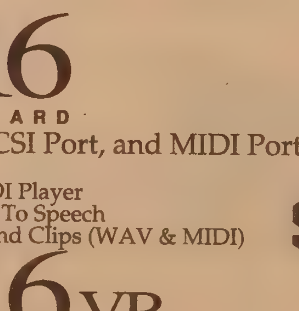

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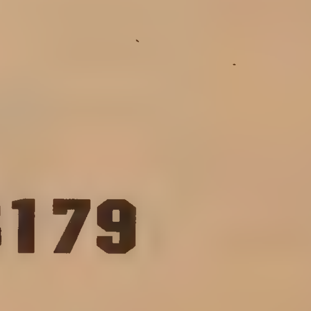

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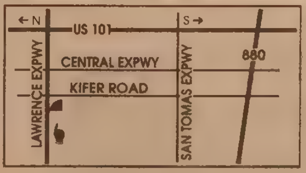

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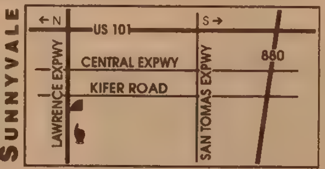

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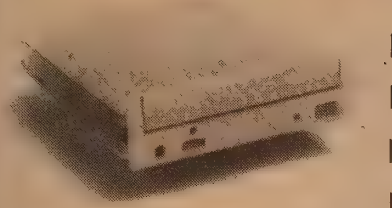

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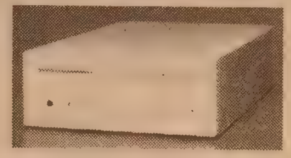

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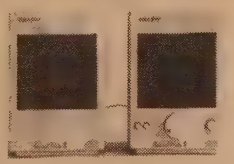

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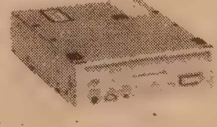

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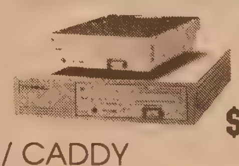

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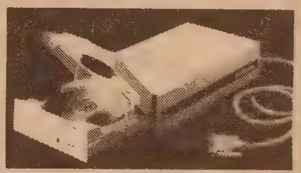

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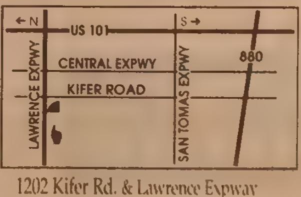

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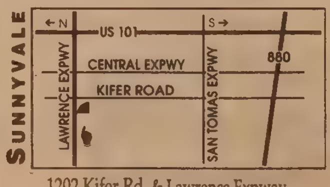

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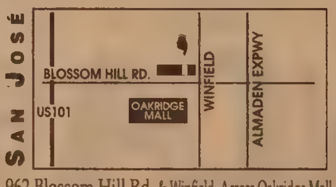

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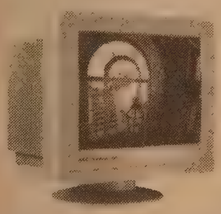

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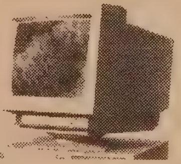

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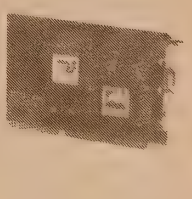

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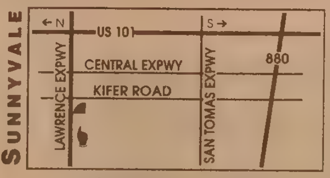

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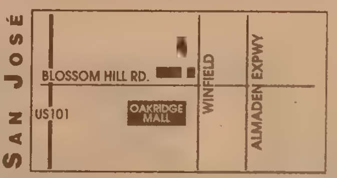

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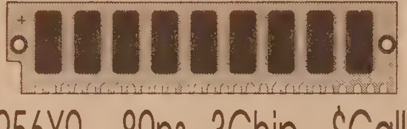

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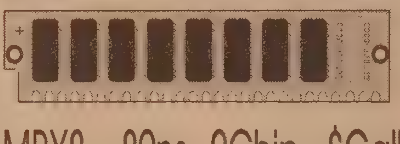

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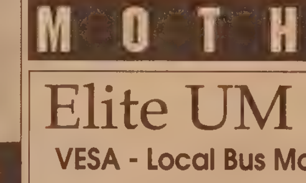

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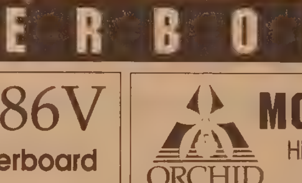

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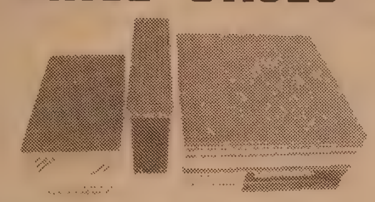

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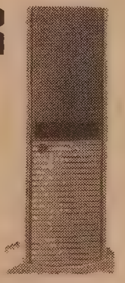

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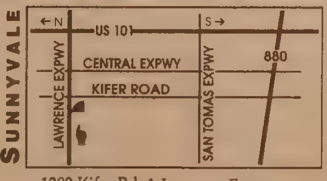

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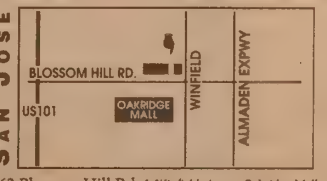

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High-Tech Pens For Law Enforcement

Orange County Sheriff's Department Initiates Move To Paperless Environment In The Field As Well As The Office With Pen-Based Computers.

BY JOHN WOLCOTT

RESOURCES:

PenUltimate, Inc.
19000 MacArthur Blvd., Ste. 620
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(714)476-6360

GRiD Systems Corp.
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Building on their belief that staying on the cutting edge of technology is an important factor in providing top-notch police services, the Orange County Sheriff's Department is again breaking new ground. A pilot program to test the feasibility of using notebook/pen computers in the field has been launched in Laguna Niguel.

The Sheriff's Department was the first law-enforcement agency in California to use a specialized fingerprinting system, Cal-ID, the first to have a DNA laboratory, and the first to install video cameras in patrol cars. They are not the first to test the use of computers on patrol. Previous trials within other departments have shown limited success, but the Orange County Sheriff's Department is optimistic that the combination of well-written software and portable computers will enhance officer performance in the field.

The Orange County Sheriff's Department serves a total of eight Southern California communities as well as unincorporated county territory. Laguna Niguel was selected as their test site for pen computing by officials because of a relatively small community population (fifty thousand) and varied geographical terrain. PenUltimate and several hardware manufacturers have teamed up in providing customized software and hardware to enable officers more "on the street" time and less clerical duty.

The current system requires officers to spend approximately one hour per day filling out detailed daily activity logs, initial crime reports, and follow-up reports. This is regularly followed by editing and review by departmental supervisors, distribution of multiple copies of the edited reports to various divisions, and permanent record filing.

Pen computing is expected to streamline this process. The Computerized Officer Productivity System (C.O.P.S.) is a complete package of customized software, from PenUltimate, and specially designed pen-based computers created to easily integrate report information with police databases. The software is Windows-based and provides a familiar, easy-to-use graphical environment. Officers use a pen to point at the function for entry and may choose from a prepared list of data or enter their own. Several pen computers are being tested to determine durability and ease of use, including 386-based units from GRid and Toshiba. They will average in price around $2,400 for the department and weigh in at approximately 5lbs.

The pilot program will entail use of the pen computers by officers to store software generated reports stored on floppy disk; to be transferred to a main Sheriff's Substation computer at the end of daily shifts. This information can then be easily edited on a word processor and distributed by computer network within the station.

According to Larry Taylor, senior vice president at PenUltimate, the trial program will not include all of the features expected to be incorporated into the C.O.P.S. system. Larry commented, "This is just the first step in the natural progression of features." He expects that once field officers become familiar with the use of the computers for report entry, communication by telephone modem and/or radio modem from the field will speed transfer of useful information on a real time basis. For example, when an officer enters a suspect's description information into his report, this could be made immediately available to other field officers by transmitting back to the station's network and being rebroadcast to other officers and made available for crime analysis in matching to other related crimes.

Many law-enforcement agencies across the country have inquired at PenUltimate about the C.O.P.S. system and will be carefully scrutinizing the Orange County Sheriff's pilot program. If all goes well, it is anticipated that the C.O.P.S. system will become the standard for many agencies. Paul Mondschein, president and chief executive officer at PenUltimate commented, "We will be able to customize the C.O.P.S. software for any agency's individual and specialized needs."

Sheriff's Department officials are impressed with the system, but are awaiting reaction from the Sheriff's Deputies "in the trenches" before making any purchase decisions. "We're not just going to run out and buy machines. There will be some tests to see if it saves time." Lt. Joe Davis said.

At a recent press conference, held by the Orange County Sheriff's Department, Laguna Niguel city officials, and PenUltimate, Inc., the pilot program was officially announced. Chief of Police Services for Laguna Niguel, Lt. Davis was asked pointedly if C.O.P.S. will eliminate jobs within the department. He answered, "I do not expect that any jobs will be eliminated. Rather, it will be a shift of job duties for the current employees."

Time will tell whether the departmental staff is able to adapt to this shift of job functions. Sources in the department believe this move to a paperless environment could result in machines replacing people. The use of portable computers will most certainly provide more accurate reports from deputies, as well as speeding report entry to departmental records. ■

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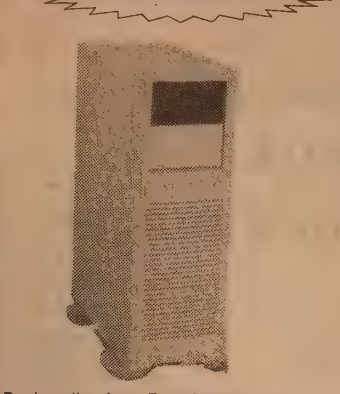

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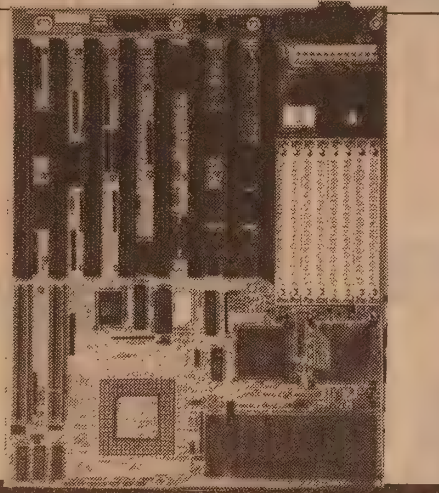

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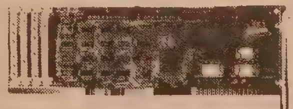

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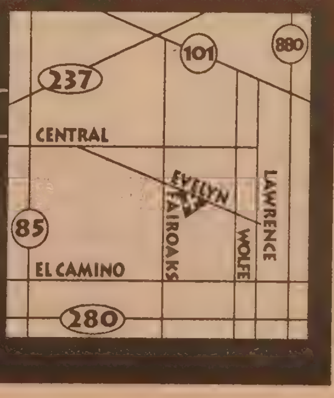

"I began to think of the interface as an art form, and then unexpectedly to think of myself as an artist."

—Myron Krueger

Report From TISEA

BY ANNA COUEY and MICHAEL ROBIN

RESOURCES:

TISEA

Australian Network for Art and Technology
PO Box 8029 Hindley St.
Adelaide 5000,
Australia
61-2-360-5607
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The Third International Symposium on Electronic Art (TISEA), which took place in Sydney, Australia, November 9–13, 1992, was an international forum for artists, scientists, musicians, critics, theorists, and performers, to explore questions concerning recent developments in science, art, and technology and their impact on cultural evolution. Hosted by the Australian Network for Art and Technology, and funded by federal cultural agencies, the Australian Film Commission and the Australia Council for the Arts, TISEA was held in thirteen sites across Sydney. Its participants gathered from Australia, Asia, Africa, North America, South America, and Europe.

TISEA was the first of the International Symposium on Electronic Art conferences to take place outside the Netherlands (Utrecht and Groningen hosted the first two)—and has firmly launched the symposium as a mobile international forum. FISEA (that is, the Fourth International Symposium on Electronic Art) will take place in Minneapolis; future conferences are in the planning for Finland and Canada. The roving nature of the conferences allows local culture, aesthetics, and artists to shape each one differently.

In the US there are a number of forums that are supportive of the developing field of electronic art. SIGGRAPH and CyberArts in particular present some of the most renowned and innovative artists in the field. However, they do so in a context of scientific, technological, and commercial practice. In contrast, ISEA conferences focus on artistic investigation of new technologies and the work of independent artists. While scientific and technological discussions take place at ISEA conferences, they are framed by questions of meaning and cultural implications. As of yet anyway, there are no trade shows at ISEA conferences.

CULTURAL DIVERSITY IN THE GLOBAL VILLAGE

Organized around the dual themes of "Art and the Algorithm" and "Cultural Diversity in the Global Village," TISEA was a dense, stimulating and inspiring event—due largely to the vision and dedication of its local organizers, including conference director Ross Harley and conference chair Gary Warner. Myron Kreuger gave a keynote address on "Response is the Medium"; concurrent sessions addressed topics such as virtual reality, artificial life, networking the globe, automata, culture and cognition, machines and perception, fractals, computer animated poetry, virtual bodybuilding, access and appropriation. In the evenings were electronic exhibitions, theatre, and performance—including a tremendous screening of computer graphics video works by artists.

TISEA established a rather unique (even for the field of electronic art) and dynamic forum by unabashedly showcasing both high- and low-tech works, and by actively addressing issues of cultural and social implications of new technologies—including questions such as:

- Will interactive and immersive electronic technologies that are evolving out of Euro-American cultures largely prove to be a vehicle of Western cultural domination? Do they simply perpetuate the trajectory of a mind/body split? What will be the impact of these technologies as (and if) they are disseminated to and molded by diverse cultures? For instance, what does telecommunications mean for the culture of the Australian Aborigines, for whom meaning and identity is rooted in the earth? Is an Ethiopian electronic artist relinquishing his native culture by using computerized tools to represent it?
- Racism and cultural inequity in general was discussed and criticized, in particular the lack of communication between cultural groups. The recognition of widely variant access to equipment for artists from different countries permeated both the exhibitions and discussions of global cultures.
- Would technologies and interfaces created by women be different than those created by men? What is the status of women in cyberspace? What is possible and what are our visions and dreams for the future?
- What is the justification for the use of expensive tools for creative expression, particularly for artists working with high-end virtual reality technologies? Do new technologies in the hands of artists become a more powerful force for cultural and social equity than traditional artistic media? Does "aesthetic" investigation stand strong enough on its own to justify the expense of the medium?
- What do electronic tools (such as prosthetics) imply about the future of physical human evolution? Are we leaving our bodies? Will we pull our electronic prosthetics into our bodies? (a la nanotechnology).

ART WORKS

"What's interesting is how the human-machine interface generates alternate performance possibilities and extends the body beyond the capabilities of its mere physiology and the local space it occupies."

—Stelarc

Electronic art means more than computer graphics. TISEA presented a variety of artistic approaches to human/computer interactions—including virtual reality and artifical

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Anna Couey (email: couey@well.sf.ca.us) is a writer and artist. She is the Network Coordinator for Arts Wire, a computer networking project to facilitate communications within and among the national arts community. She specializes in cultural applications of new communications technologies.

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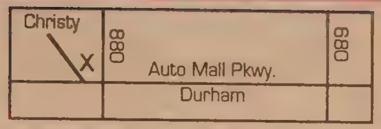

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MULTIMEDIA

NEC CD-ROM 84/74 (280ms)	$420/570
Mitsumi CD-ROM (350ms) w/Card	185
Panasonic CR-522 (380ms)	205
Toshiba XM-3401 Int/Ext	420/520
Creative Labs Sound Blaster Pro Deluxe	120
Creative Labs Sound Blaster 16 ASP	198

MODEMS

US ROBOTICS

Courier 144 v.32bis v.42 MNP5 Int	$372
Courier 144 v.32bis v.42 MNP5 Ext	375
Courier 144 w/Fax Ext	395
Courier HST-DS 144 v.32bis v.42 MNP EXT	725
Sportster 96 Modem MNP5 Int/Ext	149/159
Sportster 96/96 Fax Int/Ext	159/159
Sportster 14.4/14.4 Fax MNP5 Int/Ext	175/195
Sportster 14.4/14.4 Fax for Mac Ext	225
Shared Access Modem Sharing Kit	672

PLOTTERS/DIGITIZERS

HOUSTON INSTRUMENTS

Im Maker 1117 A/B Pen HPGL	$632
DMP-161 A-D 8 Pen HP-GL/2	2625
DMP-162 A-E 8 Pen HP-GL/2	3495
DMP-162R A-E 8 Pen Roll Med	3975
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DIGITIZERS

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IS/ONE 12x17 4btn/12btn/Pen	530
(IS/ONE also available w/Cordless 4btn or pen)	
XLC 24x36	1260
XLC 18x24	1070

CALCOMP

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12x18	629
18x24	1275
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12x12 P Series	485

SCANNERS

MICROTEK

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MS-II OCR Scanner	669
ADF-600 Auto Sheet Feeder	480
Scanmaker 45T for transparencies	NEW

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Netware Lite w. Win Utilities	75
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-5/10/50/100 User	489/1089/1995/2945
Netware 3.11	
-5/10/20 User	599/1345/1885
-50/100/250 User	2650/3859/6885
Netware 4.0	
-5/10/25 User	935/2095/2895
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SMC (Western Digital)

Ethernet Plus Elite 8 Bit Coax	$115
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3016 16 Bit Coax/16 Bit TP	145/149
Ethernet Elite 16 combo/6 pk	175/840
Ethernet Plus/A for MCA/TP	215/219
Ethernet Elite 32 bit Coax/TP	650/660
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APC UPS Monitoring Board for Netware	69
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-for slim, baby or mid tower	143
-for AT desktop/full tower	163
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-for slim	145
-for desktop/full tower	120
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InnerSource 2210 UPS for full tower, Int 95-132v 220W DC, 100W AC=550VA Ext UPS	299
Novell Netware Interface	
-for InnerSource 2210 UPS	55

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Omni 600 LAN (UPS 425W + Line Regulation)	385

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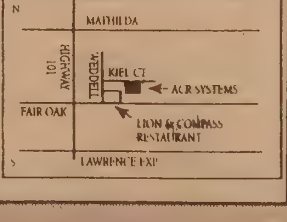

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PRODUCT SPOTLIGHT

New Products

PC HARDWARE

COPYBUS 3

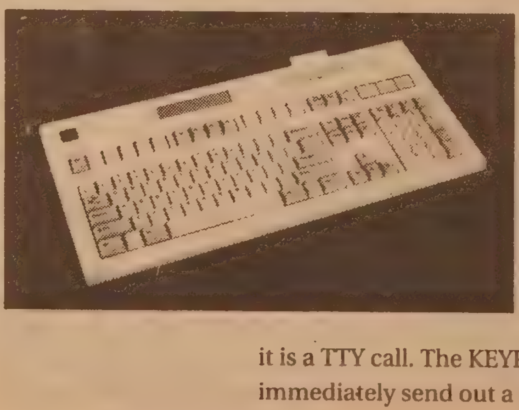
The CopyBus system features a unique disk loading mechanism to meet the demands for 3.5" floppy duplication. The Basic loader connects to a computer or dedicated controller to be used for small-to medium-size duplication jobs. The upgraded, standalone duplicator uses off-the-shelf PC-bus components for IBM format disk duplication. A multiformat version is also available to handle all of the popular formats—IBM, Apple, Macintosh, Amiga, Atari, and Commodore. With a single input bin, the unattended production capacity is limited to sixty disks. For high-production environments, the CopyBus is designed to work with multiple input and output bins. (Basic unit, $2750; standalone version, $3750; multiformat version, $4750) Costas Systems, 5625 Brisa St., Livermore, CA 94550. (408)997-1644.

PARS DATASAFE SYSTEM

DataSafe is a fault-tolerant, RAID 1, disk mirroring system compatible with all Intel-based computers. If a hard disk fails, DataSafe alerts you of the problem and automatically switches operation over to its second, working disk. Your work continues without an interruption or loss of data. To provide maximum data security and portability, DataSafe can be used with a removable hard drive. The drive can then be stored in a safe location or moved to a computer at another site. DataSafe is compatible with the software you are using as well as all IBM-compatible hardware and most local area networks. Pars International Computer, Inc., 22441 Foothill Blvd., Hayward, CA 94541. 1-800-947-4742.

KEYPLUS

Presently, commercial organizations have tremendous difficulties with TTY communications. Failure to properly handle a TTY call can result in a dissatisfied customer and violate federal laws. The KEYPlus has a teletypewriter (TTY) built into a standard, 101-key, IBM compatible PC keyboard. It operates independently from the PC and switches between PC and TTY modes with no effect on any PC programs. With a built-in TTY Call Detector, when the KEYPlus hears Baudot tones it immediately alerts the call taker visually and audibly that it is a TTY call. The KEYPlus can then automatically and immediately send out a gretting message. ($799) HITEC



UPDATES

➢**AddressMate Software** released **AddressMate 1.6**, its automatic envelope addressing and bar coding program for PCs. Registered users may upgrade for $19.95. AddressMate Software, Inc., 6715 Canyon Trail, El Cerrito, CA 94530-1705. (510)237-7460.

➢**Banner Blue** introduced **Family Tree Maker 3.0**. This upgraded version now handles more than twice as many names per family and includes a new tree style that fits more people onto a single page. Existing users can upgrade for $19.99, plus $5 shipping. Banner Blue Software, Inc., PO Box 7865, Fremont, CA 94537. (510)795-4490.

➢**Claris Clear Choice** introduced **Power To Go 2.0**. This new version of the PowerBook utilities package now includes StuffIt SpaceSaver file compression utility which transparently compresses a user's files and folders. An upgrade from v1.0 is available for the cost of shipping and handling. Claris Corp., 1-800-3CLARIS.

➢**Equilibrium Technologies** released **DeBabelizer 1.5**, a powerful updated version of its software for automated graphics processing and translation. Registered users may upgrade for $74.95. Equilibrium Technologies, Inc., 475 Gate Five Rd., Suite 225, Sausalito, CA 94965. (415)332-4343.

➢**Magnetic Software** released **BlankCheck 2.0**, a program that enables users to print MICR-encoded checks on an ordinary HP LaserJet printer. Magnetic Software, Inc., PO Box 1703, Mount Airy, NC 27030. (919)786-1336.

➢**Microsoft** announced **Publisher 2.0 for Windows**, incorporating more than twenty-five new features into v2.0. Microsoft Corp., One Microsoft Way, Redmond, WA 98052-6399. (206)882-8080.

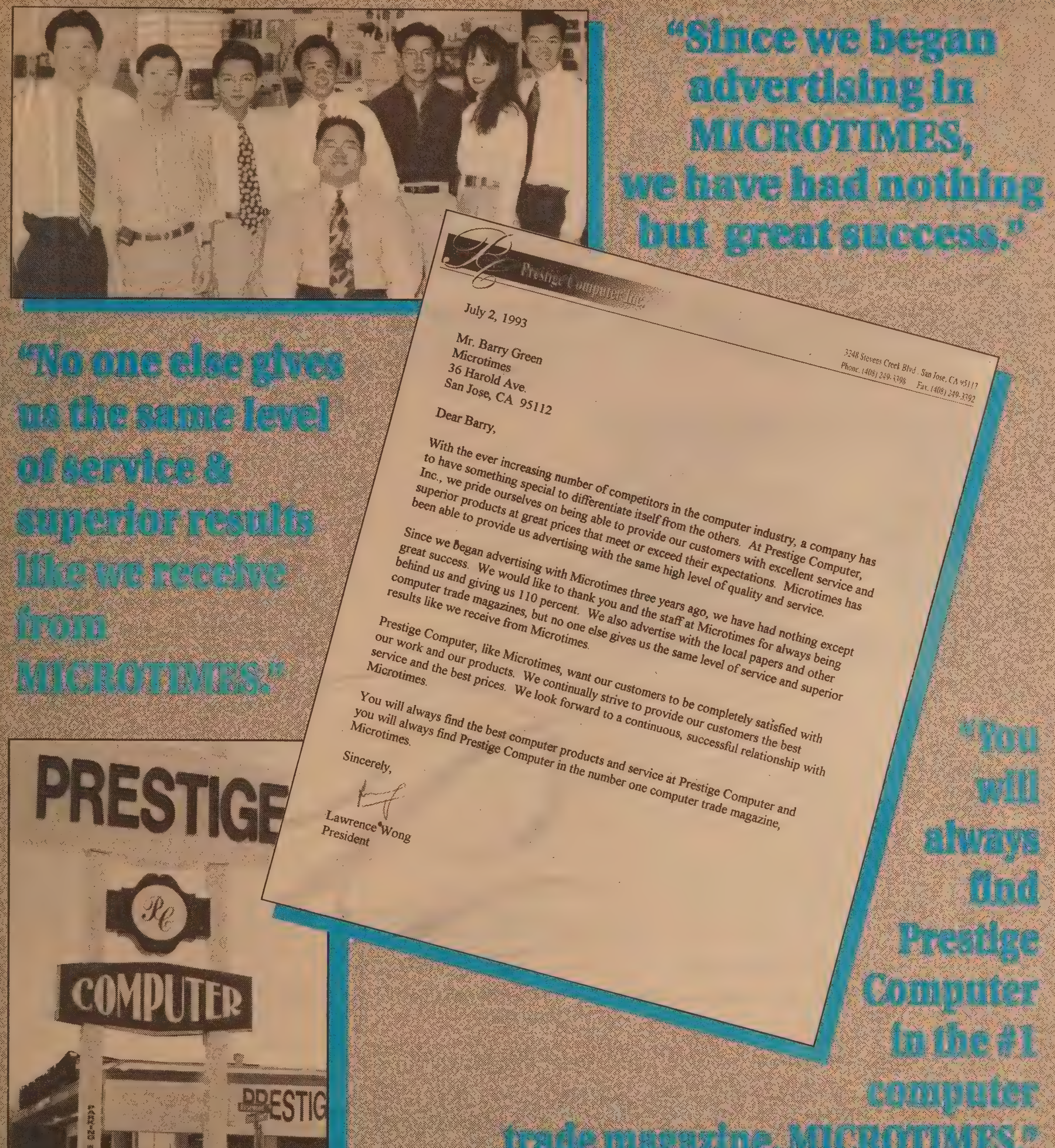
➢The **Display Products Group of Mitsubishi Electronics America** announced a new **three-year limited warranty** on its new and current 14" to 21" color monitors. Mitsubishi Electronics America, Inc., 5665 Plaza Dr., Cypress, CA 90630. 1-800-828-6372.

➢**Number Nine Corp.** announced an aggressive upgrade plan offering users of ATI and Diamond graphics boards discounts to upgrade their system with the #9GXE graphics accelerator. Number Nine Corp., 18 Hartwell Ave., Lexington, MA 02173. (617)674-2919.

➢**Shiva Corp.** announced **K-STAR 9.2**, a software upgrade kit for the **FastPath 5**, its LocalTalk-to-Ethernet gateway. Shiva Corp., Northwest Park, 63 Third Ave., Burlington, MA 01803. 1-800-458-3550.

➢**Stalker Software** announced **PortShare Lite 2.0**and **PortShare Pro 2.0** networking software for the Macintosh. The PortShare products enable users to share printers, modems, plotters, and other serial devices on an AppleTalk local area network. Global Way, PO Box 1613, Campbell, CA 95009-1631. 1-800-262-4722.

➢**Strategic Mapping** released **Atlas MapMaker for Windows 1.1**. Version 1.1 is available as an upgrade for $49.95. Strategic Mapping, Inc., 3135 Kifer Rd., Santa Clara, CA 95051. (408)970-9600.



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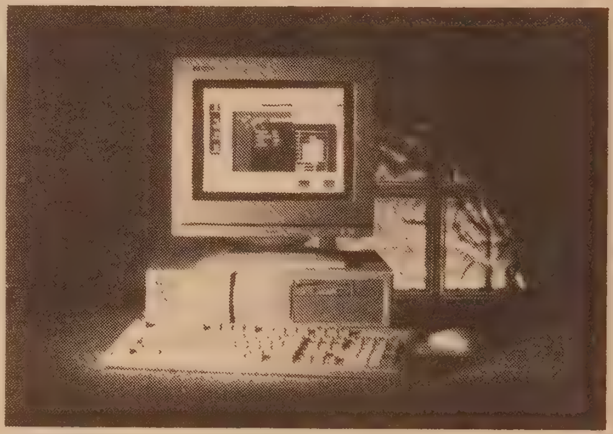
Group International, Inc., 8205 Cass Ave., Ste. 109, Darien, IL 60559. (708)963-5588.

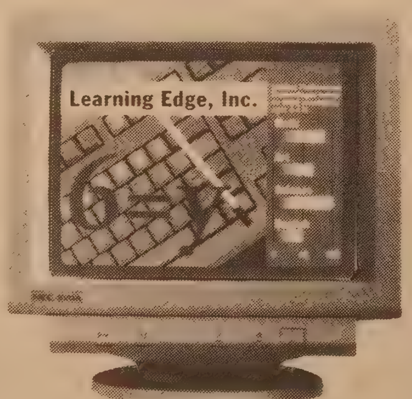
HP VECTRA 486VL SERIES

The Vectra 486VL series is the latest entry in Hewlett-Packard's expanding PC product family. Standard models include the 486SX/25, 486DX/33, and 486DX2/66. The SX/25 and DX/33 models offer a choice of 120MB or 240MB hard disk drives, and the DX2/66 comes standard with a 240MB hard disk drive. The Vectra 486VL series comes standard with 4MB of RAM, expandable to 32MB, and includes four mass-storage shelves (two front-accessible) and four ISA (AT) slots. The latest local bus video and graphics-accelerator technology has been incorporated to provide outstanding performance. All Hewlett-Packard PCs carry a three-year, limited warranty. (List price from $1219 to $2359) Hewlett-Packard Co., 974 E. Arques Ave., Sunnyvale, CA 94086.



LOW-COST NEC SVGA

The NEC SVGA, a low-cost, high-resolution solution Super VGA color monitor, is ideal for entry-level business applications, corporate network installations, home office, and first-time purchasers. The VESA-compliant SVGA monitor features non-interlaced resolutions up to 1024 x 768. It is ergonomically designed with a modern cabinet, a removeable tilt swivel base, small footprint, and easy-to-use front controls. The SVGA also has NEC's Reduced Magnetic Field Technology for low ELF/VLF emissions. ($415) NEC Technologies, Inc., 1255 Michael Dr., Wood Dale, IL 60191. (708)860-9500.



SGI HARDWARE

SILICON GRAPHICS INDY

The Indy system brings a new level of visual computing to your desktop—for under $5000. Based on the MIPS R4000 64-bit microprocessor and housed in a compact chassis that sits under the monitor, the Indy supports up to 256MB of RAM, 2GB of internal disk storage, and seven SCSI-2 devices. The IndyCam, a color digital video camera, can be mounted on top of the color monitor or be moved to capture video and still images throughout the user's environment. The system features front-panel audio volume adjust buttons, a digital video port, composite and S-video inputs, an analog microphone, six-channel digital audio processing, and Photo CD support. Highly integrated analog and digital video enables random access editing, video mail, and desktop conferencing. In addition, the system is capable of running PC and Macintosh applications through emulation, by sharing removable media, or by coexisting in Novell and AppleTalk networks. ($4995) Silicon Graphics, Inc., 2011 N. Shoreline Blvd., Mountain View, CA 94043-1389.

MULTIMEDIA HARDWARE

WINMOVIE

WinMovie is a low-price, full-motion video capture and playback board from Sigma Designs. It is optimized for creating Audio Video Interleave (AVI) movies under Microsoft Video for Windows and is capable of capturing video at up to 30 frames per second (fps) from any NTSC or PAL composite and S-Video device, such as a VCR, video camera, or laser disc player.

Video sequences captured by WinMovie can be edited and used for professional multimedia presentations, interactive training, and educational materials. WinMovie's interface allows the board to be fully compatible with all Super VGA adapters, does not require a VGA feature connector, and is compatible with any 386/33MHz PC or faster. Sigma Designs provides WinMovie DTV utility software with the WinMovie adapter. ($299) Sigma Designs, Inc., 47900 Bayside Pkwy., Fremont, CA 94538. 1-800-845-8086.

AUDIOSHOW

Addressing one of the main needs of multimedia computing—outputing sound and graphics to TV and videotape—audioSHOW combines a VGA-to-NTSC encoder with a full-function 16-bit digital audio board. audioSHOW takes the signal from a VGA port and converts it into PAL or NTSC video to allow the user to record computer animation, presentations, or games onto videotape, or to display computer graphics on a television set. It also provides full multimedia capabilities by incorporating a 22-voice FM synthesizer, CD-ROM interfaces (SCSI and ST-Bus), a joystick port, MIDI In/Out, and a built-in audio amplifier. audioSHOW includes drivers for both DOS and Windows and supports Microsoft's multimedia extensions. Bundled software includes Aristsoft's Wired for Sound Pro 2.1 and Lenel's MultiMedia Works. ($695 for the NTSC version, and $795 for the PAL version) AITech International, 830 Hillview Court, Suite 145, Milpitas, CA 95035. 1-800-882-8184.

PRINTER

PANASONIC BUDGET DOT MATRIX

The Panasonic KX-P1150 is a 9-pin, near-letter-quality printer targeted at budget-conscious students and home users. The setup disk allows users to easily access all commonly used printer functions while they are operating their computer. It handles functions such as text enhancements, emulation, page formats, and character sets. The KX-P1150 features three draft fonts—pica, elite, and micro—and four resident near-letter-quality fonts—Courier, Roman, Bold PS, and San Serif. The printer has a 4K buffer capacity (expandable to 32K) and an optional cut sheet feeder. It also comes with a Centronics parallel interface, and incorporates IBM Proprinter III and Epson FX-850 emulations. ($169.95) Panasonic Communications & Systems Co., Two Panasonic Way, Secaucus, NY 07094. 1-800-742-8086.

PC SOFTWARE

SCHWARZENEGGER AUDIOCLIPS

Sound Source introduced Terminator 2: Judgment Day and Total Recall AudioClips for Windows 3.1. Both packages feature state-of-the-art sound effects to give your PC a "personality." Each AudioClips package also includes Whoop It Up!, a utility that assigns sound files to system events such as start and exit, plus application events such as opening, sizing windows, and closing. These are not simply Schwarzenegger showcases. Also featured are other actors' voices from the two films, including Linda Hamilton and Robert Patrick from *T2*, and Sharon Stone from *Total Recall*. Sound Source Unlimited, Inc., 2985 E. Hillcrest Dr., Suite A, Westlake Village, CA 91362. (805)494-9996.

BARS & STRIPES

Bars & Stripes, running under Microsoft's Word for Windows, is a bar code software product designed as a productivity tool for the front office. For the first time users of Word for Windows have access to a powerful bar code capability that works hand in hand with the other features of Word. After installation, a new icon appears on the Word toolbar. Creating bar codes is now as easy as pushing buttons. ($99.95) Tippecanoe Systems, Inc., 5674 Stoneridge Dr., Suite 119, Pleasanton, CA 94588. (510)416-8510.

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Mountain View	Foothill Disposal	1935 Terra Bella Ave.	(415) 967-3034
PENINSULA/MARIN COUNTY			
San Mateo	Elks Club	229 West 20th Ave.	(415) 345-4886
Marin	Marin Recycling	535 Jacoby St.	(415) 453-1404
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Berkeley	Berkeley Recycling Ctr.	2nd and Gilman	(415) 524-5355
Oakland	Community Recycling	3550 Adeline	(415) 653-2104
San Leandro	Resource Recovery	2615 Davis St.	(415) 638-2303
Hayward	Action Recycling	727 Industrial Pkwy	(415) 537-6075
Danville	San Ramon High School	140 Love Ln.	(415) 837-0533
Walnut Creek	Buyback Pacific Rim	1400 Kazebeer Ln.	(415) 372-8524
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San Francisco	Haight-Ashbury Recycle	Frederick and Arguello	(415) 753-0932
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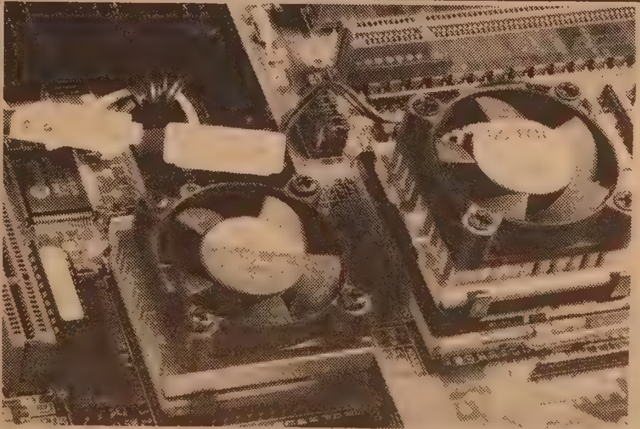
South SF	Royal Salvage	180 Oyster Point Blvd.	(415) 589-5511

For more information or for recycling centers near you, contact:

California Recycling Hotline 1-800-553-2962

*Source: California Solid Waste Management Board



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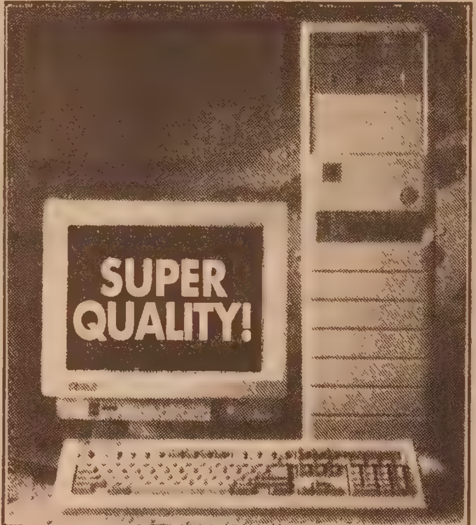

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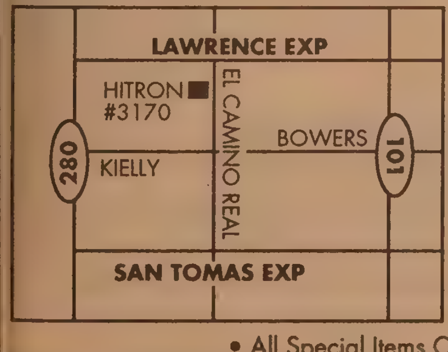

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GAME REVIEWS

By Mike Markowitz

COGITO

Graphics and Animation: 8
Sound: 8
User Interface: 7
Overall Value: 8

Designed By: Jerome Cretaux
Programmed By: Frederic and Corinne Mizac
Published By: Inline Software
For: MS-DOS (VGA graphics, 4MB RAM, Windows 3.1 or higher)
List Price: $59.95

Cogito ergo sum.
(I think, therefore I am.)
—Rene Descartes (1596–1650; French mathematician and philosopher)

WORLD'S TOUGHEST
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BRAIN GAME
COGITO

In an age of monster games that consume 10 or 20MB of precious hard disk space in one piggish gulp, it is refreshing to find that attractive and engaging entertainments can still be crafted into tight code that fits on one floppy disk.

Cogito won the Best Mac Game of the Year trophy from Apple France (at least some part of Apple understands the importance of game programmers in the advancement of software technology). Inline, a small publisher of stylish Mac software, has now made Cogito available to the vast Windows market. The Windows implementation is very neat, with a pop-up menu triggered by the little-used right mouse button. The whole thing is just under a megabyte: one 942K executable and two small .wav sound files.

The game is deceptively simple. You are presented with a nine by nine grid of variously colored marbles arranged in a geometric pattern. Each row and column has a control button. The computer scrambles the pattern, but a small version of the original pattern remains visible in the corner of the screen. You must manipulate the controls to restore the pattern. If you succeed you advance to the next level. You also get a password that lets you start a new game at the highest level you have previously attained.

Aha, you tell yourself. Zese French, zey are not so clever, n'est-ce pas? This is merely a two-dimensional implementation of Rubik's Cube.

Level one—no sweat.

Level two—mmmm, OK, got it.

Level three—oops... Now the control buttons have been reversed, so that the Row three button actually controls the movement of Column three, etc., etc.

There are 120 levels. The moves and geometric figures become more complex at each level. Anyone who reaches the top level earns an "I Beat Cogito" T-shirt, and a chance to win a maxxed-out PC or Mac system.

Clever, these French. With enough time, scratch paper, and relentless application of deductive logic, I know that I can figure out how Level 8 works.

My only criticism of the design is that the rows and columns should have been numbered or lettered. Perhaps the fiendish programmers thought that would make things too easy for lazy Americans.

The program is easily installed from a single high-density 3.5" floppy disk. An 8-page booklet and a quick reference card provide effective documentation. People who love puzzles will find endless hours of delight in Cogito. (Inline Software, Inc., 308 Main St., Lakeville, CT 06039-1204. 203/435-4995)

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Designed By: Roger Keating, Ian Trout, Gregor Whiley, and Nick Stathopoulos
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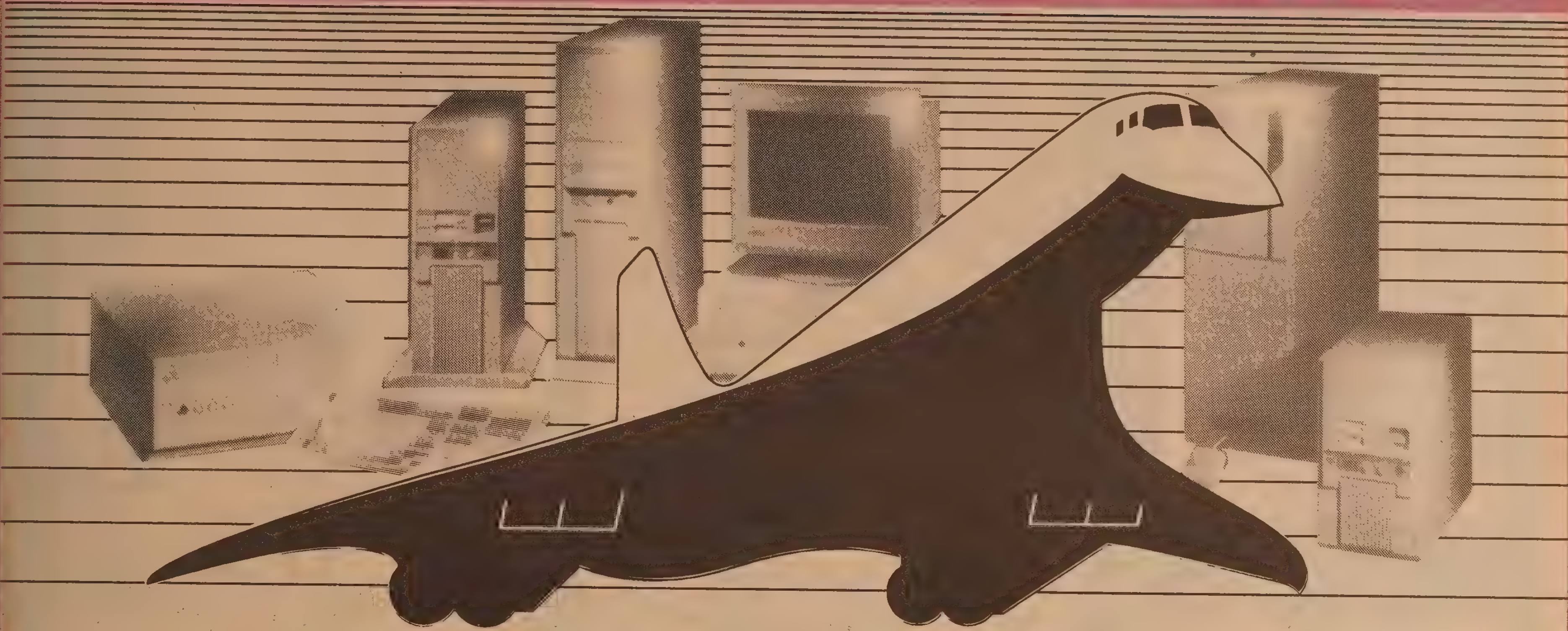

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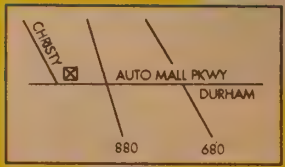

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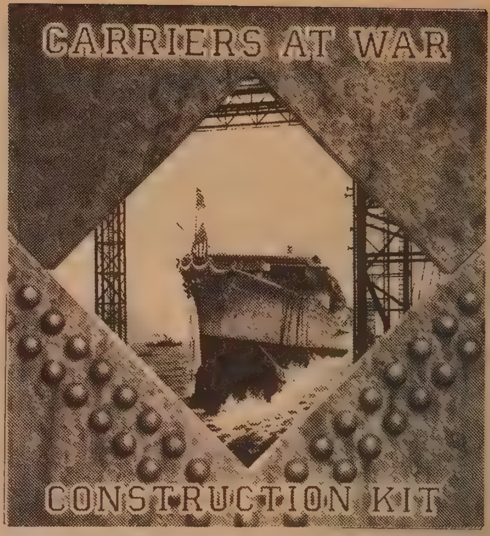
Graphics and Animation:	9
Sound:	8
User Interface:	7
Overall Value:	8

Extended RAM, 80386 or higher CPU, mouse; supports Adlib and Sound Blaster compatible audio, requires original Carriers at War Game)

List Price: $60

When Carriers at War was released last year, SSG promised there would be a scenario editor someday. That day has arrived, and the result is a post-graduate level course for non-programmers in the mechanics of designing and implementing an historical simulation.

Carriers at War was a strategic simulation of six great naval battles of World War II in the Pacific. Performance characteristics of individual ships and aircraft are modeled in great detail; indeed the game mechanics keep track of individual bombs and torpedoes. But the focus of the game is on decision making at the fleet and task force level—you are Admiral Nimitz or Yamamoto, nervously pacing the bridge or standing over the plotting board as garbled and incomplete reports filter in from all points of the compass.



The Construction Kit package includes three elements—an installer that updates and patches the original version of the program, three new battles (Wake, Tarawa, and Guadalcanal), and finally the WarRoom, an elaborate development environment for creating and editing new scenarios and variants. The software is installed from three high-density disks. The original game plus the Construction Kit require about 7MB of hard disk space.

The game has a straightforward mouse-based, menu-driven user interface, and detailed color graphics of ships and aircraft. As ships take hits, the fires and explosions are animated. But the best part of the game system is the "artificial intelligence" that lets you play against the computer. The computer opponent follows definite plans, and reacts to your fleet movements and airstrikes. The WarRoom routines offer a fascinating glimpse into the workings of a program that makes "intelligent" decisions. The system is based on the metaphor of a deck of cards. Each side, each land base, and each naval task force has a set of cards that define its objectives and how it will respond to events in the game. This comes close to the Holy Grail of programming for non-programmers. By adding or changing the statements on the cards, you can design alternate strategies for the program to execute.

The 336-page manual includes a detailed tutorial that walks you through the creation of the Wake Island scenario step by step. Appendices provide tabulated data on almost every type of Japanese and American ship and aircraft that took part in the Pacific War. Some players may be disappointed by the rather abstract and schematic way the game system resolves surface combat, when opposing fleets actually come within sight of each other. But this is a strategic game, not a simulation of ship vs. ship tactics.

Another title in the continuing saga of Carriers at War has been announced for release by fall of 1993: Japan Sweeps South will cover historical and hypothetical fleet operations in Southeast Asia and the Indian Ocean during the period 1936–1946. (SSG, Inc., 8348 Monticello Dr., Pensacola, FL 32514. 904/494-9373)

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150:1 RATIO 101 KEY

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• 486DX-33 w/256K Cache	2245
• 386DX-40 w/128K Cache	1975

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9.5" 1024x768 101 Keys

• 486DX2-66 MHz w/256K Cache	$2595
• 486DX-50 MHz w/256K Cache	2495
• 486DX-33 MHz w/256K Cache	2395
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★ BOTH PORTABLES ARE AVAILABLE IN EISA & LOCAL BUS ★

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(Looks Like and Has The Same Configuration As The Plasma Above)

• Case And Video Card Only	$795
• 486DX2-66 MHz w/256K Cache	2095
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• 486DX-33 MHz w/256K Cache	1795
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486DX2-66 w/128K Cache	1375
486DX-50 w/128K Cache	1295
486DX-33 w/128K Cache	1145
386DX-40 w/128K Cache	925
Upgrade To 256K Cache	+20

ALL SYSTEMS ABOVE INCLUDE:
- 4 MB RAM
- 212 MB IDE H. Disk (13ms)
- Teac 1.2 MB or 1.44 MB Floppy
- SVGA Monitor (1024x768 .28 dpi)
- SVGA Video Card w/1 MB
- IDE 2HD/2FD Controller
- 2 Serial/Parallel/Game Port
- Enhanced 101 Keyboard
- Mini Tower or Desktop Case
- ★ FREE 3-Button Mouse & Gift

UPGRADE	ADD:
256K Cache	$20
250MB Hard Disk	30
345MB Hard Disk	100
Non-Interlaced Monitor	30

PLEASE CALL FOR:
Other Configurations
System Upgrade/Repair
Hardware/Software

CONTROLLER & ADD-ON CARDS

Adaptec 1542B/1542BK	$210/225
DTC 3280 SCSI Controller	65
Bustek BT542BK SCSI Controller	125
IDE Controller 32 Bit Local BUS	55
144/144 Fax Modem w/WinFAX	165
96/24 Fax Modem w/WinFAX	59
Logitech Mouseman Ser/Bus	60
Microsoft Mouse w/Pad	45

MONITORS

SVGA 14" (1024x768 .28)	$238
SVGA 14" (1024x768 .28) Non-Int	259
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-On-Site Installation Available

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Diamond Stealth VLB 24-Bit	169
Diamond Stealth ISA 24-Bit	159
Diamond SpeedStar Pro VLB 24-Bit	125
Diamond SpeedStar Pro ISA 24-Bit	110

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Panasonic CD-ROM Internal	215
Maxtor 345 MB IDE HD	299
W. Digital 340 IDE HD	290
Maxtor 245 MB IDE HD	229
Maxtor 213 MB IDE HD	215
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Colorado 250 MB Tape Drive	195
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PC SOFTWARE REVIEW

ENCARTA—CD-ROM ENCYCLOPEDIA

Published By: Microsoft
Reviewed By: Woody Liswood

Microsoft's entry into the world of multimedia encyclopedias is an impressive venture—a single CD-ROM containing the entire twenty-nine volumes of text from the *1992 Funk & Wagnalls New Encyclopedia.* Microsoft has also added more than one thousand new articles to the encyclopedia as well as over seven hours of sounds and a vast array of photos, animations, and illustrations.

There are several ways to find information in Encarta. A Quick Tour option provides good instructions for using Encarta, although the controls are obvious and I suspect that very few folks will actually need this tour.

You can also navigate your way by subject matter. I remember as a child flipping through the encyclopedia looking for something interesting to read. While rummaging through Encarta isn't as easy as the days of my hardcover browsing, it can't get much closer—a simple click moves you to the previous or next article. For just browsing, however, a random access option in which Encarta flips around to different images or topics, spends a few moments there to see if you want to stop or goes on to another image would be an ideal feature

An alternative method to access information is through the Encarta Atlas. Click on a specific spot on the globe and Encarta takes you there.

If you are interested in a particular time period, a Timeline will take you directly to information about what was happening. Then, using search and associations, you can delve as deep into a topic as you wish.

Fun is never more than a few clicks away. A Maze game lets you work through the rooms in a castle; select the door to go through and correctly answer a question to enter. All this while sound blares from your speakers. As you inhabit each room, you can pause the game and explore further.

Encarta will export text and graphics directly to your word processor or print as you go along.

Encarta is a masterful accomplishment for Microsoft. It certainly shows the potential of the MPC and CD-ROM for the future. I'm looking forward to seeing what the rest of the Microsoft CD-ROM products will accomplish. Encarta is a good start and may be tough to beat. (Microsoft Corp., One Microsoft Way, Redmond, WA 98052-6399. 206/882-8080)

MACINTOSH SOFTWARE REVIEWS

FLO'

Published By: The VALIS Group
List Price: $199
Reviewed By: Matthew Leeds

Special effects and morphing have become all the rage these days. Flo' easily falls into this category, and brings some unique capabilities to the Macintosh. The simplest explanation for its function is to think of it as digital rubber canvas. It allows you to perform regional and global distortions to an image without digital artifacts. Distorted images can be output at any resolution, and animations of the distortion process can be created in several formats.

Images in Flo' can be scaled, rotated, skewed, and stretched in any

continued on page 240

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Lowest Prices

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MEMORY SIMMS

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4 MB-70	CALL
16 MB-70	CALL

72 PIN SIMMS

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4 MB-70ns	CALL
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OKI 400 2MB	129
Panasonic 4420/4450i	129
Epson Action Laser II/8000, 2MB	139
NEC Model 95, 2MB	129

SPECIAL MEMORY MODULES

Toshiba 4400/C, 16 MB Card	$849
Toshiba Others	CALL
Compaq 286N, 386N 4MB Module	199
Compaq, Others	CALL
AST 4MB WPB SIMM	199
AST, Others	CALL
IBM 55SX/70 2MB Module	109
IBM, Others	CALL

MATH COPROCESSORS

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387 DX/33	79
387 DX/40	89

NOTEBOOKS & ACCESSORIES

Toshiba 1850, 120MB	$1499
Toshiba 4400C, 200MB	4195
Toshiba, Other Models	CALL
Texas Instruments 4000, 486Sx-120MB	1950
Compaq Contura 486SI, 120MB	2050
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Other Models	CALL

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213MB IDE	269
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120MB SCSI	259
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HP LaserJet 4	1399
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OKI Laser 400	539
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Panasonic 2123	239
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IBM Printers	CALL

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486, 386 VESA Local Bus Motherboards	
Micronics 486-33 VLB Motherboard	$775
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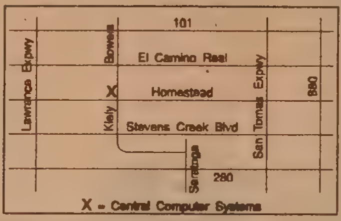

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(CAD STATION)

Super Board
4 MB, TEAC 1.2 FD
Maxtor 130 MB HD, IDE Controller, 2S 1P
Mid Tower Case w. 220W
Mitsumi 101 Keyboard
EMC 1430 monitor 14" 1024x768 .28 NI
Fahrenheit VLB 1MB VGA
MS Serial Mouse, MS DOS 6.0 & WIN 3.1

VLB 486-33, 256K cache	1665
VLB 486-50, 256K cache	1835
VLB 486-DX2-66, 256K cache	1895

MICRONICS
COMPUTERS INC.

4 MB, TEAC 1.2 FD
IDE Controller, 2S 1P
Baby AT Case w/ 200W
Mitsumi 101 Keyboard
MS Serial Mouse
MS DOS 6.0 & Windows 3.1

486-DX2-66 ISA 256K cache VLB	1365
486-33 ISA 256K cache VLB	1155
486-33 ISA 256K cache MiniBoard	1135
486-50 ISA 256K cahce MiniBoard	1265
486-DX2-66 ISA 256K cache MiniBoard	1345

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(MADE IN U.S.A).

4 MB, TEAC 1.2 MB FD
IDE Controller, 2S 1P
Baby AT Case w. 200W
Mitsumi 101 Keyboard
MS DOS 6.0 & WIN 3.1
MS Serial Mouse

486-DX2-66 EISA 256K VLB	1485
486-50 EISA 256K cache VLB	1385
486-33 ISA VLB 256K cache	1025
486-DX2-66 Mini EISA 256K cache VLB	1295

IBM PS/Value Point

With : 1.44MB FD, IDE Contorller, Keyboard, Mouse, I/O ports, SVGA
Case : AT (DeskTop , 5 slots, 5 bays)
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with OS/2 & 8MB RAM :

486 DX2-66	527MB HD, MT, VLB	3295
	340MB HD, AT, VLB	2745
	212MB HD, AT, ISA	2350
486-DX-33	340MB HD, MT, VLB	2525
	340MB HD, AT, VLB	2345
	212MB HD, AT, ISA	1765

with WIN & DOS & 4MB RAM :

486 DX2-66	527MB HD, MT, VLB	3125
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	212MB HD, AT, ISA	2125
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	212MB HD, AT, ISA	1645
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II HARDWARE

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Gallant Sound Card	69
Labtec Speakers	25
Koss Maximum DR Amplified Speakers	69
Koss Amplified Mini Speakers w. Equalizer	45
Turtle Beach 16 bit MultiSound	515
CREATIVE LAB	
CD-ROM Upgrade Kit w. 4 CD Int	375
CD 531 Ext w. Ext Kit	239
Discovery CD-16 Int	469
Edutainment CD-16 Int Kit	519
Sound Blaster Pro Multimedia Kit w. 6 CD titles - Internal / External	515/459
Sound Blaster Deluxe	89
Sound Blaster Pro Deluxe	129
Sound Blaster Pro + Midi Kit	149
Sound Blaster 16 ASP	205
Video Blaster / Video Spigot for Win	315/415
Voice Blaster / Wave Blaster	75/224
Midi Kit	59
LOGITECH	
Soundman 16	135
MEDIA VISION	
Multimedia Upgrade Kit (w. Spectrum 16)	779
Midi Mate / w. Passport Design Trax	55/89
Pro 16 Multimedia System II	869
Pro Audio Studio 16	195
Pro Audio Spectrum 16	159
Pro Movie Spectrum	239
MITSUMI	
CRMC-LU005S w. controller	189
NEC	
CDR-74 280ms, 300KB/s, Ext	525
CDR-84 280ms, 300KB/s, Int	439
Interface Kit for PC	89
Multimedia Upgrade Kit Int / Ext	895/995
SONY (w/o software)	
CD 31A w. controller Int	235
TEXEL	
DM-3024 265ms, Int / w. controller	365/435
DM-5024 265ms, Ext / w. controller	445/515
Driver kit for CD-ROM Int / Ext	29/69
TOSHIBA	
3401B 200ms 300KB/s Int / w. controller	435/505
3401E 200ms 300KB/s Ext / w.controller	559/629
Driver kit for CD-ROM Int / Ext	29/69
TRANTOR	
Mini SCSI Plus (Parallel to SCSI Adapter)	159
Music Box v.2	29
T130 Interface Kit	79

CD SOFTWARE Titles - See Sec. III

2. CASES

Baby AT w. 200W Power	69
Baby Tower w. 200W Power	69
Mid Tower w. 230W Power	79
Mid Tower w. 250W Power: Black/ White	139/129
Full Tower w. 250W Power	129
Full Tower w. 300W Power: Black/ White	199/189
Slim w. 200W (2 drive bay)	79
Hard Disk Drive External Casing	
- 1 half ht or SCSI for Mac, 40W, w. Int cable	99
-2 half ht or 1 full ht for PC , 60W	119
- 2 half ht or 1 full ht for Mac, w. cables 60W	139
- 3 half ht or 1 full &1 half ht for PC, 60W	139
- 3 half ht or 1 full &1 half ht for Mac, w. cables	159

3. CONTROLLERS

4 Floppies w. IDE for AT (USA made)	39
COREL SCSI software	75
ACCULOGIC	
sIDE-4 plus (2FD & 2IDE HD, 2S & 1 P)	49
ADAPTEC	
1522K SCSI w. Kit (3MB/s)	159
1542C SCSI w. Kit (10MB/s)	249
1542C Plus w. ASW 500	315
1640 SCSI w. Kit for MCA	335
1742A SCSI EISA w. Kit (2F & 2H)	425
ASW-1410 ASPI MS-DOS Manager v3.0	69
ASW-EZ SCSI for DOS & WIN	69
ASW-310 Sy-Tos Plus (tape backup s/w)	99
AIR	
IDE w. I/O VLB	69
ALWAY TECHNOLOGY	
AL1000 Pro Corel	189
IN 2000 High Performance 16 bit SCSI	179
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AMI	
FastDisk cache SCSI EISA (up to 16MB)	495
FastLan Ethernet-SCSI VLB	465
DTC	
2290 IDE EISA	139
3280AS SCSI	105
3290AS EISA SCSI host adapter	479
6282 1:1 ESDI	125
7287 1:1 RLL	73
FUTURE DOMAIN SCSI Controller	
TMC 1660 for AT (H only)	119
TMC 1660 DNK for AT (H only) w. Kit	219
TMC 1680 for AT (4F& H,15MB/s)	139
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MYLEX	
DCE 376 EISA SCSI w.4MB cache	725
NCL America (w. on board Bios)	
538B IDE for AT (2HD & 2FD)	45
ORCHID	
VESA LBus IDE (2HD,2FD) w. AT I/O	79
PROMISE Drive Cache Controller	
DC 200 IDE cache up to 16MB	119
DC 2032 IDE I/O cache up to 16MB	139
DC 2040 SCSI cache up to 16MB	215
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ULT 24F SCSI EISA 64K cache	375
ULT 34F VL Bus SCSI-2 32K cache	285

4. CPU

AMD386 DX-40	75
INTEL	
386 DX-25 / DX-33	75
486 DX-33 / DX-50	299/439
486 DX2-50 / DX2-66	409/519
MATH CO PROCESSOR	
CYRIX	
83D87 - 33 / 40	75/85
Cx486 DLC 33 / 40	105/155
INTEL	
387DX / 387SX	85/79
OverDrive Processor	
- 486 SX16 / SX20	395
- 486 SX25 / DX25	495
- 486 SX33 / DX33	659
Cooling Fan (heat sink)	19.50

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SummaSketch III 12x12, 4 or16 button	275
SummaSketch III 12x18, 4 or16 button	549

6. DRIVES

Frame for 3.5" Hard Drive and Floppy Drive	6
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CP30174E 170MB 18ms IDE 3.5", 1" ht	185
CP-30254 250MB 14ms IDE 64K 1" ht	249
CP-3504 500MB IDE 1/2 ht	595
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LXT 7345A 345MB 14ms IDE 3.5"	299
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MXT 7345S 345MB 15ms SCSI 1" ht	395
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MXT 1240S 1.2GB 8.5ms SCSI-2 3.5"	1169
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PI-17S 1.7GB 13ms SCSI	1195
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LPS-240S 244MB 16ms SCSI 256K cache	275
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PRO-700S 700MB 10ms SCSI-2 512K	925
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7. I/O CARDS

KOUWELL	
2S 1P 1G w. NS16550 chipset (XT, AT)	49
4 Serial ports card	69
AT I/O (2S 1P) / AT I/O (2S 1P 1G)	27/27
AT I/O (2S 2P)	33
AT I/O w. IDE (2S 1P 1G)	34
Printer card / Serial card (XT, AT)	15/15
QUICKPATH	
13 port I/O w. 4-16550UARTS (2 IDE, 4F, 4S, 2P, 1G)	125
STB 4-COM	
4 serial, 16 bit, w.16554, support COM 1-8, IRQ 2,3,4,5,10,11,12,15	109
SIIG	
2S 1P 1G w. 16550 chipset	49

8. KEYBOARDS

FOCUS	
FK2001 101 click	42
FK8000 111 w. calculator	45
FK9000 129 keys Programmable	65
NORTHGATE OMNI	
101S /101NI / 102	55/69/69
Ultra T or F	95
SIIG (click)	
Suntouch Jr. 84-key Mini	45
Suntouch 101	49
OTHERS	
BTC 84-key Mini	39
KeyCat II 101 w. trackball mouse	69
Keytronic 101	37
Maxi 101 / Maxi Key 124	35/79
Mitsumi 101	30
PT505C 101	27

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SIMM-ply Ram 8/16 bit, 8MB max, XT, AT	145
SIMM-ply Ram 16 bit, 8MB max, PS/2-50,60	169
SIMM-ply Ram 32 bit, 8MB max, PS/2-70,80	179
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SIMM Mac : 4 MB x 8 - 70 / 80 ns	call
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- T5100/ T13100/ T1600 2MB	115
- T8500/ T5200 2MB / 8MB	125/339
LASER PRINTER MEMORY UPGRADE	
Jet Ram (3rd Party):	
EPSON EPL 6000	
-- 2MB/ 4MB	129/199
HP	
- Deskjet 500/500C	
-- 256K	69
- Laser Jet IIP+/ III/ IIIP/ IIID	
-- 1MB / 2MB / 3MB / 4MB	75/115/155/195
- Laser Jet II/ IID	
-- 1MB / 2MB / 4MB	95/135/205
PANASONIC	
- KX-P4410/ 4430	
-- 1MB / 2MB / 4MB	95/135/215
- KX-P4420/ 4450i	
-- 1MB/ 2MB/ 4MB	99/139/209
- KX-P4450 --1MB	129
- KX-P4455 --2MB	159
QMS	
- P-S 410	
-- 1MB / 2MB / 4MB	99/139/209
- P-S 815/ 825	
-- 2MB / 4MB	159/229
TEXAS INSTRUMENTS	
- Micro Writer --1MB	69
PACIFIC DATA:	
Pacific 4 for HP IIP+/ IIIP/ III/ IIID	
-- 1MB / 2MB / 4MB	89/129/209
1-2-4 Plus for HP II/ IID	
-- 1MB / 2MB / 4MB	115/155/235
Pacific 4 SIMM for HP 4/ IIISi/ XL300	
-- 4MB / 8MB	189/339
Pacific T for Epson 6000	
-- 2MB / 4MB	199/299
ProTracer	
-- 5MB / 8MB	375/525

11. MODEMS & FAX

ASAP TF-333 Phone & Fax Auto Switching	89
National Semi TyIN 2000 Answer/Fax	165
Micc Global Pocket Fax, Tripple 96	139
Adtech Micro Systems (DOS & WIN)	
Data Fax 9624VI, MNP5	99
Hi - Per 96/144, MNP5	199
Pocket 96/24 Fax	115
Pocket 144/144 Fax	269
E-Tech	
Bullet modem 9696 MNP5 Int/ Ext	135/155
Ufomate Pocket Fax modem (w. Win/DOS s/w)	
- P1496MX / P9696MX	265/199
- P1414MX (Distinguish ring & Called ID)	295
EVEREX	
Evercom 9600 v.42, v.32, MNP5 Int	135
FRECOM (special)	
Fax 96 w. 1 Liner & Far Fetch Fax	115
Fax 96 & modem for DOS	99
GVC	
14.4 Fax Modem Int / Ext	159/179
HAYES	
Accura 2400 Int / Ext	49/55
Accura 96 Ext + 96 Fax	239
Accura 14.4 Ext + 144 Fax	265
Optima 96 Ext + Fax 96	375
Optima 144 Ext + Fax 144	389
Pocket edition 2400 w. Smartcom EZ	129
Ultra 96 v.42, MNP5 Ext	545
Ultra 144 v.32bis, v.42, v42bis Ext	575
V-series SmartModem 9600 v.42, MNP5 Ext.	499
Smart Com Exec/ WIN	75/109
Smart Com III	119
INTEL	
Faxability Plus/OCR for WIN trade-up	99
SatisFaxtion modem (w. FAXability s/w)	
- 100 Int send96 rec.48, 2400 modem	99
- 200 Int 96/24 v.42, MNP5	295
- 300 Int 96/144 v.42 (no scan port)	245
- 400 Int 144/144 v.42, v.32bis, MNP5	395
- 400e Ext 96/14.4, 4K data buffer	425
New Fax Modem 96 Int / Ext	165/179
New Fax Modem 14.4 Int / Ext	189/219
MEGAHERTZ	
PCMCIA 14.4 Fax/modem w. X-Jack	469
PCMCIA 96/24 Fax/modem w. X-Jack	299
PZ144 Pocket 14.4/14.4	415
MICROCOM	
Microporte 4232bis Fax modem	465
QX 4232bis modem	455
QX 4232bis+ modem	575
PRACTICAL PERIPHERALS	
PM14.4FX14.4 Int	225
Pocket 14.4 Fax Modem	369
Mini Tower 96/96 Ext	209
Mini Tower 14.4/14.4 Ext	235
96/48 Fax 2400 Mini modem	95
PM2400 Mini pocket modem	119
FaxMe (turn HP Laser to Fax receiving)	175
SIIG	
TeleCommunicator 10-in-1 Fax Modem	239
US ROBOTICS	
Courier 144 v.32bis, v.42, MNP5 Int.	375
Courier 144 v.32bis, v.42, MNP5 Ext	385
Courier 144 w. Fax Ext	399
Courier HST-DS 144 v.32bis, v.42, MNP Ext	725
Sportster 96 modem MNP5 Int/ Ext	149/159
Sportster 96/96 Fax Int/ Ext	159/159
Sportster 14.4/14.4 FAX MNP5 Int/ Ext	169/189
Sportster 14.4/14.4 Fax for Mac Ext	209
Shared Access Modem Sharing Kit	675
ZOLTRIX	
2400 baud modem w. MNP5 Int	39
96/24 send & rec. fax/modem w. MNP5 Int	69
96/24 fax/modem v.42, MNP5 Int	99
14.4/14.4 fax/modem Int.	159
ZOOM	
AFC Int	69
AFX Ext	89
FC9624V w. WinFax Lite Int	99
FX9624V w. WinFax Lite Ext	109
96/96 Fax/modem MNP5 Int/ Ext	195/215
144/144 Fax/modem Int/ Ext	209/229
96/96 w. WinFax Lite Int/ Ext	199/219
144/144 w. WinFax Lite Int/ Ext	215/235
ZY-XEL	
U1496B 16.8 voice 14.4 Fax WINs/w Int.	345
U1496B+ upgradable to 19.2Kbps Int	455
U1496E 16.8 voice 14.4 Fax WIN, LED Ext	349
U1496E+ upgradable to 19.2Kbps Ext	459

12. MONITORS

9" VGA Mono paper white 640 x 480	135
SIIG	
9" Mono paper white	115
EMC	
EM 1412 14" Mono amber, 90-260v	95
EM 1428 14" 1024x768 .28, 90-260v	279
EM 1430K 14" 1024 x 768 .28, NI, 90-260v	315
EM 1439G 14" 1024 x 768 .39	235
IBM PS/Value Point	
6312 14" 1024x768 .28, NI	399
6314 14" .28, NI w. Digital Pro Control	515
6319 15" Flat 1024x768 .28, NI	639
MAG (Auto Switch Power Supply)	
PMV1448 14" 1024x768 .28, NI	365
MX14S 14" 1280x1024 .26, Sony Trinitron	525
MX15F 15" Flat 1280x1024 .28, NI, MacII	535
MX17F 17" Flat 1280x1024 .26, NI, MacII	975
Mac Adapter	25
MITSUBISHI	
HL6955SETK 20" 1280x1024 .31, NI	1745
Diamond Pro(TFS 6705) 17" 1280x1024 .26 NI,Trinitron, MacII, 100-240v	1075
BNC Cable	39
NANAO (100-240v)	
F340iW 15" Full Flat screen,1024x768 .28	699
T560i 17" 1280x1024 .25, NI, MacII	1695
F550i 17" 1280x1024 .28, NI, Mac	1075
F550iW 17" 1280 x 1024 .28, NI, Mac	1125
T660i 20" 1280x1024 .31, NI, Trin. , MacII	2595
F750i 21" 1280x1024 .31, NI, MacII	2095
MacII cable adapter	69
NEC (120v)	
3FGe 15" 1024x768 .28, Mac	579
4FGe 15" Flat 1024x768 .28, NI, Mac	709
5FGe 17" 1024x768 .28 NI (no Accu color)	1099
6FG 21" Flat 1280x1024 .28, Mac	2395
NEC Monitor Lens (Anti-reflection, Anti-static)	
- for 4FG / 5FG / 6FG (special)	(65)/(105)/185
FG / MacII cable adapter kit	19.50
PANASONIC (90-140v)	
C1381i 14" SVGA 1024x768 .28, Int, MacII	325
C1395 14" 1024x768 .28, NI, MacII	435
C1991 20" 1024x768 .31, NI, MacII	1455
POWER II	
3E 14" SVGA 1024x768 .28, Int, 90-264v	285
SAMSUNG	
CSD5577 15" Flat 1024x768 .28,NI	455
CSF7487 17" 1280x1024 .26, NI, 90/264v	899
SEIKO (90-132v)	
CM1450 14" 1024x768 .25, NI	425
CM2050 20" 1024x768 .31, NI, Mac	1495
SONY	
1430S 14" 1024x768 .25, NI, 120v	599
1604S 17" 1024x768 .25, NI, 100-240v	965
1730 17" 1024x768 .25, NI	995
2038 20" 1280x1024 .30, NI	2295
VIEWSONIC	
4e 14" 1024x768 .28, Int,110/220v	305
5+ 14" 1024x768 .25, NI, MacII	475
5e 14" 1024x768 .28, NI, MacII	395
6e 14" 1024x768 .28, NI	335
15 15" 1280x1024 .28, NI, Mac II	545
17 17" 1280x1024 .28, NI, Mac II	1125
20 20" 1600x1280 .28, NI, Mac II	1825
Mac cable adapter	35

13. MOTHERBOARDS

386-33 w. 128K cache (no cpu)	125
386-40 w. 128K cache (no cpu)	129
486-33 128K ISA (no cpu)	135
AIR (w/o cpu)	
486-33 / DX2-66 256K, 3VLB slots	235
486-50 256K, 3 VLB slots	235
486-50 256K EISA, 3 VLB slots	475
486-33 / DX2-66 256K EISA, 3 VLB slots	465
EISA upgrade to 512K cache	100
AMI	
Super Voyager 486-33 256K VLB	795
Super Voyager 486-50 256K VLB	945
Super Voyager 486 DX2-66 VLB	1125
Enterprise II 486-50 EISA 128K	1045
Enterprise III 486-33 256K VLB EISA	915
Enterprise III 486-50 256K VLB EISA	1115
Enterprise III 486 DX2-66 256K VLB EISA	1235
IBM	
486SL-C2-33 / 66 16K internal cache ISA v.2 w. CPU & Math Processor	365
LYNX (made in USA, w/o cpu)	
486DX - 33 / 50 / DX2-66 256K VLB	149
MICRONICS	
386SX-20 Phoenix BIOS (32MB max)	175
386-33 64K cache Gemini (32MB max)	299
486-50 256K cache EISA E2	1195
486-33 Local Bus w. 256K cache	655
486-DX2-66 Local Bus w. 256K cache	865
486-33 256K EISA VLB	1025
486-DX2-66 256K EISA VLB	1395
MiniBoard 486-33 256K cache ISA	635
MiniBoard 486-50 256K cache ISA	765
MiniBoard 486-DX2-66 256K ISA	845
16MB Memory Card	150
NICE (w/o cpu)	
486-33 / DX2-66 256K VLB	225
486-50 / DX2-66 256K Mini EISA VLB	295
486-50 / DX2-66 256K EISA VLB	465
ORCHID (w/o cpu)	
Superboard 486.(VLB for VGA & controller)	
- DX33/ DX50/ DX2-66 256K	239/265/245
QUICK-PATH	
486-50 w. 64K cache, 15ns ISA (no cpu)	275

14. MOUSE

JOYSTICK :	
Warrior 5, Quick shot	14.50
Adapter kit	16.50
THRUSTMASTER	
Flight Control / Pro	75/125
Rudder Control	125
Weapons Control MK II	139
AGILER	
AGM-600E Serial 400 dpi	23.50
ATB-610 Serial Trackball	24.50
Keen	12.50
APPOINT (portable)	
MousePen Pro (portable)	49
Thumbelina (portable)	49
GENIUS	
GM-F302 (3 button)	29
KENSINGTON	
Bus	115
Expert serial & trackball	99
LOGITECH	
Cordless	89
Dexxa Serial / First Serial	27/37
Fotoman Digital Camera for PC & PS/2	485
Mouseman Bus / Serial	64/59
Scanman 256 / w. OCR software	179/219
Scanman color - 16.8 million colors	439
Trackman Portable / Trackman Combo	99/75
MICROSOFT	
Mouse w. WIN 3.1	149
Ball Point (portable)	119
Bus 2.0 (oem) / w. Bus Card	59/75
Bus 2.0 w. Expansion Card	89
Serial 2.0 (oem)	55
Serial 2.0 w. PS/2 port	79
Serial 2.0 w. 9 to 25 pin adapter	79
MOUSE SYSTEMS	
New Point (trackball for laptop & PC)	54
Little Mouse PC (2 button optical) serial	29
Omni (2 button) MS compatible	25
PC III Serial (optical) / Mouse Pad	59/19
PC Trackball II	55
Page Brush - color scanner	399
Pen Mate - digitizer	155
Serial Bus Card (9 IRQs)	24
The New Mouse 400CPI (3 button)	55
The White Mouse w. Power Panel	39

15. NETWORK

Dyna DL 2000 card	215
MAILMAN 2.0 (10-user for Novell NetWare)	199
Mainlink II 3270 Emulation IBM & IRMA	369
SilverNet Software / Starter Kit	79/425
3COM	
3C503 8 bit coax / TP ethernet	179/199
3C503-16 Etherlink II 16 bit coax / TP	169/179
3C507 16 bit coax ethernet	279
3C507-TP 16 bit TP ethernet	299
3C509 Etherlink III coax / 5 pack	139/625
3C509 Etherlink III TP / 5 pack	145/650
3C509 Combo	155
3C579 Etherlink III EISA coax / TP	245/249
3C529 Etherlink III for MCA	245
3C529 TP Etherlink III for MCA	249
3C621 Link Builder 10 BT (12 port)	745
3C623 Single port BNC Module	125
TokenLink III 16/4 ISA/ MCA/ EISA	465/495/645
Link Match SNMP/NLM software	269
ADDTRON (Novell Approved)	
ET-200STS NE2000 coax compatible	69
ET-200TPS NE2000 TP compatible	79
AE-200STA NE2000 3 in 1 Combo	89
AE-200LC 8 or 16bit BNC & TP	72
Starter Kit for Novell Lite 1.1	255
Starter Kit for Lantastic AI DOS / WIN	279/299
Transceivers : ET10TB (TP<-->AUI)	59
Transceivers : ET10CB (BNC<-->AUI)	59
HUB : UTP8 (8TP + 1BNC)	265
HUB : UTP16 (16TP + 1BNC + 1AUI)	495
Pocket Adapter : BNC / TP	135/139
Arcnet :	
- Arc110HI 8bit star/bus coax	59
- Arc120TP 8bit Combo	65
- Arc220TP 16bit Combo	75
- 8 port active Hub coax / TP	135/145
Token Ring :	
- 16/4 ISA / MCA	379/399
- Mau 1 / Mau 3	295/295
ALLIED TELESIS (CentreCOM)	
AT-1500T TP / AT-1700T	79
AT-1500BT / AT-1700BT (TP+BNC)	99
AT-1500FT / AT-1700FT (TP+Fiber optic)	275
Transceiver MX10S (BNC to AUI)	49
Transceiver 210T (AUI + TP)	49
10 BaseT 4 port Repeater :	
- MR410T (external power supply)	355
- MR420T (internal power supply)	299
ARTISOFT (Lantastic)	
AE-2 Ethernet starter Kit v5.0,10Mbps	449
AE-2 Ethernet starter Kit v5.0 WIN	509
AE-2 Ethernet adapter	(185)195
AE-2 Ethernet adapter for MCA	265
AE-3 Ethernet starter kit 4.1 + upgrade to 5.0	485
AE-3 starter kit WIN 4.1 + upgrade to 5.0	525
AE-3 Ethernet adapter	225
2Mbps adapter	139
AE-1/T 8bit 10Base-T adapter	135
AE-2/T 16bit 10Base-T adapter	199
64K RAM upgrade for AE-2, AE-3 adapter	45
AI software v5.0 DOS / 6 pk / 12 pk	75/395/720
AI software v5.0 WIN / 6 pk / 12 pk	85/455/840
Articom (LAN modem sharing s/w)	225
Artiscribe System s/w	299
Artiscribe System HW + s/w Kit	345
Central Station Connectivity Processor 5.0	399
Ethernet software kit v5.0 DOS w. cable	79
Ethernet software kit v5.0 WIN w. cable	139
Lantastic Z (2 stations) v5.0	89
Lantastic for Netware (Network O/S)/ v5.0	99/275
Lantastic for Mac s/w Kit	339
Lantastic for Mac HW + s/w Kit	549
Lantastic Print Server Station Ware	69
Netware Print Server Station Ware	69
Network Eye (Remote Control Access)	129
NR 2000C (BNC only) / Starter Kit	175/469
NR 2000T (RJ 45 only)	179
Peer-Hub 10Base-T concentrator	270
Peer-Hub AUI Interface Kit	270
Remote Boot ROM for AE-2, AE-3 adapter	45
Sounding Board adapter Kit	72
StationWare (Dial Up Connection)	69
ATTACHMATE	
3270 coax adapter for AT/MCA	469
Extra! for WIN	349
Extra! Extended for DOS	349
CASTELLE	
FaxPress (Network Fax Server)	
- Novell 1 line Ethernet coax	2595
- Novell 2 lines Token Ring 16/4Mbps	3225
JetPress (Network Print Server) for HP II,IID,III,IIID, coax / TP	429

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LANPress (Print Server) connects up to 4 printers	
- Ethernet Thick/Thin coax (1P 3S)	475
- Ethernet Thick/Thin coax (2P 2S)	625
- Ethernet 10BaseT (1P 3S) / (2S 2P)	475/635

CC:MAIL

cc:Mail DOS v4.0	199
cc:Mail WIN platform 2.0	335
cc:Mail 10-user / 25-user pack	239/579
cc:Mail Gateway v3.21	859
cc:Mail FAX v1.2	1350
cc:Mail Remote	199
cc:Mail Router 4.0	875

COMPULAN

Ethernet	
- 8 bit E100 coax / ET500TP	69
- 16 bit E200 coax / ET600TP	79
- Boot Prom (for E100/ E200/ E300/ E600)	25
- Hub 8 port TP +1BNC +1 cascading	265
- 12 port TP +1BNC +1 AUI +1 cascading	465
- Pocket adapter for coax / TP	159
Arcnet	
- 16 bit for XT/AT Star Combo	69
- 16 bit for XT/AT Bus / Combo	79
- 16 bit "4-in-1" Turbo Star & Bus (w. NCR 90C98A ASIC)	99
- 4-port Arcnet Passive Hub	19
- 8-port Coax Stackable Active Hub	149

D-LINK

Network Cards	call

KINGSTON

Networks Cards	call

FARALLON

PN381 PhoneNet w.Timbuktu for WIN	259

GATEWAY COMMUNICATION

G/Ethernet 16 coax / 32 bit	99/350

INTEL

EtherExpress Flash LAN Adapter (combo)	155
EtherExpress 16 coax/16 TP	135/139
EtherExpress 5 pack coax/ TP	545/555
EtherExpress 16 MCA / 16 MCA TP	179/189
EtherExpress 32 EISA	439
12 port Hub EtherExpress ISA Adapter	565
12 port Hub EtherExpress EISA Adapter	645
LAN Protect 1.5 (virus protection)	685
LAN Sight 3.0 Netware Utility / Monitor	299
LANSpool s/w 386 NLM v3.5.8	425
NetPort II Thin /Thick Ethernet	519
NetPort II 10BaseT	529
NetPort II Token Ring	759
NetSatisfaxtion V.2 (s/w for NOVELL)	955
RJ45 Harmonica	55
TokenExpress 16/4 ISA/ EISA/ MCA	535/685/535

NOVELL

NE1000 coax ethernet (special)	99
NE2000 plus coax ethernet / 5 pack	135/595
NE2000-TP plus TP ethernet / 5 pack	129/575
NE2000 Netware Lite starter kit	365
NE2000 Plus Combo / 5 pk	145/650
NE3200 Eagle coax EISA	675
NE3200 EXOS coax EISA	625
NTR 2000 Token Ring	435
Eagle NE10T 4 Port Hublet	225
EPROM for NE2000	35
EXOS NE10T-Hub, 8 Port (8 TP + 1 coax)	335
Print Server NPE400 (special)	(295)350
Netware Lite 1.1 + DR DOS 6.0	65
Netware Lite w. Win Utilities	75
Netware 3.11	
- 5 / 10 / 20-user	585/1345/1885
- 50 / 100 / 250-user	2650/3859/6885
Netware 4.0	
- 5 / 10 / 25-user	895/2045/2895
- 50 / 100 / 250-user	3925/5495/9695

SMC (Western Digital)

Ethercard Plus Elite 8 bit coax	115
Ethernet Plus Elite 16 coax / 16 TP	135/139
Ethernet Plus Elite 6 pack 16 coax/16 TP	675/695
3016 16bit coax / 16bit TP	145/149
Ethercard Elite 16 combo / 6 pk	159/795
Ethercard Plus/A for MCA / TP	215/219
Ethernet Elite 32 bit coax / TP	599/609
Netware Boot ROM for ethernet	34
8 Port Concentrator (8TP+1AUI)	349
12 Port Concentrator(12TP+2AUI+1BNC)	595
Token Ring 16/4 ISA / MCA	379
WD-8003 EP Ethernet Plus Elite 8bit coax	49
WD Lan-ETP 8bit TP (cable included)	39
WD Lan-10T/A for MCA (cable included)	65

XIRCOM (Pocket Adapter)

PCMCIA Ethernet BNC / RJ45	285/289
PCMCIA Ethernet Combo	325
PE3-10B2 coax	295
PE3-10BT TP	299
PE3-10BC Combo	329

CABLES & ACCESSORIES

Twisted pair cable, TP 4-pair, PVC, Level 3	
- 1000' / 500' / 200'	89/55/35
10 BASE-T cable, 1000' Level 3 plenum	165
RG58 cable, 1000'	109
Authen 4 port Hublet	215
Belden 8259, RG58, 1000'	165

16. POWER SUPPLIES

AMERICAN POWER CONVERSION (UPS)

APC-400 Smart-UPS (286, 386 WS)	299
APC-600 Smart-UPS (386, 486 FS)	399
APC-900 Smart-UPS (386, 486, FS & WS)	599
APC-1250 Smart-UPS (multiple FS & WS)	799
APC-450 Back-UPS 286, ps/2, 386	215
APC-600 Back-UPS 286, 386 FS	285
APC-900 Back-UPS	395
APC PowerChute Plus for Novell	75
APC UPS Monitoring Board for NetWare	69
Power Doctor (DOS) I/F Kit for Smart-UPS	79

GENERAL

250W for Baby AT/ Baby or Mid Tower	45
250W for AT	47
250W for Full Tower	49
300W for Full Tower	69
550W for UPS	279
1200W for UPS	659

PC POWER COOLING

Standard 220 for desktop / full tower	85
Silencer 270	
- for slim (baby or mid tower)	149
- for AT desktop / full tower	165
Turbo-Cool 300	
- for slim (baby or mid tower)	149
- for desktop / full tower	175
Turbo-Cool 450 for desktop / full tower	325
InnerSource 2210 UPS for full tower, Int, 95-132v, 220W DC, 100W AC, =550VA Ext UPS	299
Novell Netware Interface	
- for InnerSource 2210 UPS	55

TRIPP LITE

BC 500 Lan (UPS, 350W)	215
BC 900 Lan (UPS, 650W)	365
Iso - Bar	call
Omni 450 Lan (UPS 325W + Line Regulation)	295
Omni 600 Lan (UPS 425W + Line Regulation)	385
Omni 900 Lan (UPS 650W + Line Regulation)	545

17. PRINTERS

BROTHER

HJ-400 Desktop Ink Jet for PC or Mac	329
HL-600 Laser 6ppm	595

CANON

BJ-200	(after rebate 299)/349
BJ-300 desktop	349

CITIZEN

GSX 145 (24 pin, 132 column)	355
- Color Option for GSX 145	65
- Color Option for GSX 130	45
GSX 230 Fonts & quiet	249
GSX 240 Scalable Fonts & quiet	295
PN48 notebook, 1ppm, 2lb, battery, case	309

MICROTEK

TrueLaser MTP-306 6ppm, 2MB, 35 fonts	1195

HP (HEWLETT PACKARD LaserJet w. toner)

Desk Jet 500 / 500C / 550C	359/485/695
Desk Jet 1200C	1375
Laser Jet IIIP	839
Laser Jet 4 / 4M /4L	1359/1865/679
Laser Jet 4Si / 4SMX	2995/4295
Paint Jet / Paint Jet XL300	695/2295

LASER MASTER

Win Printer 800 (Postscript)	1095
Win Printer XL600 11x17, 600x660PPI	2395
WinJet 800 Postscript for HP II,IID,III,IIID	475
WinJet 1200 Postscript for HP 4	775

PACIFIC DATA PRODUCTS

ProTracer Inkjet, A to C size output, 360dpi, i960RISC processor, 512K, 45dBA	1175
- Postscript emulation card	375
- HP-GL emulation Card	315
- Sheet Feeder I / II	135/115
- Ink Cartridges	19.50

PANASONIC

1123 /1124i / 1624	195/259/349
- Auto Sheet Feeder for 1124 KX-P36	120
2023 24pin, quiet printer	199
2123 24 pin, 43.5dBA, color capability	239
2124 24 pin, 43.5dBA, color capability	319
2624 24 pin, quiet printer, 46.5 dBA	375
2180 9 pin, 45 dBA, color capability	159
Color upgrade Kit KX-PCK11	49
Single bin cut sheet feeder KX-PT10	95
32K Buffer dot matrix printers KX-P43	65
Serial interface card PS-13	75
4410 Laser, 512K, 5ppm	569
- Corona KX-PCR3	45
- Developer KX-PDP4	105
- Drum KX-PDM4	89
- Extra cassette KX-PKC2	45
- Fuser unit KX-PFS5	105
- Optional second cassette KX-P495	135
- Toner KX-P453	35
- Fonts Card KX-P47x (for Lasers)	95
4430 Laser, 1 MB, 5ppm	685
- Accessories same as 4410	
4420 Accessories	
- Developer KX-PDP2	95
- Drum KX-PDM2	99
- Envelope Tray KX-P431	59
- Legal Tray KX-P425	45
- Ozone Filter KX-PFT2	26
- Toner KX-P451	39
4450 Accessories same as 4450i	
4450i Laser, 11ppm	995
- Developer KX-PDP1	95
- Drum KX-PDM1	145
- Envelope Tray KX-P430	59
- Legal Tray KX-P420	45
- Ozone Filter KX-PFT1	29
- Toner KX-P450	35
4455 Postscript, 11ppm	1695
- others same as 4450i	

QMS (Adobe Postscript)

QMS-PS 410 4ppm, 2MB, 45 Fonts	1275
- Envelope / Legal / Letter Tray	69/69/69
- Lower Cassette w. Letter Tray	149
- Toner	95

SEIKO

Smart Label Printer Plus(IBM/APPLE)	149
Smart Label Printer Pro	245
Box of Label (2 rolls per box)	10.95

TEXAS INSTRUMENTS

Micro Writer PS17 / PS35 5ppm	935/1195
XLPS 17 16ppm	1895
- Apple Talk Kit	99

Laser Printer Accessories:

COMPUTER PERIPHERAL

Jet Page (for HP II)	195

HP

Optinal 500 sheet Legal Letter A4 (Jet 4)	279
Envelope Power Feeder 75 sheet (Jet 4)	279
Legal, Letter or A4 250 sheet Tray (Jet 4)	99
Legal, Letter or A4 500 sheet Tray (Jet 4)	109
Lower Cassette w. letter tray for IIP, IIIP	149
Toner for Jet II, III	79
Toner for Jet IIP, IIP+, IIIP	66
Toner for HP4	109
Postcript for Jet 4	369

IQ ENGINEERING

True Type Master Library	29
Super Cartridge 2 & 2LC	239
Super Cart. 3 Pro+ for HP III, IIID, IIIP, IIISi	199
Desk Jet 500 / Desk Jet Plus Professional	99

PACIFIC DATA

25 in One! (for Deskjet 500)	99
25 in One! III	
- for HP II, IID, IIP, IIP+, III, Microtek	245
Complete Font Library for HP III, IIID, IIIP	255
Font Bank for all HP Laserjet (New)	
stores soft fonts, 0.75MB / 1.5MB	205/269
Headlines Cartridge for HP II, IID, IIP	185
Paicfic Connect XI	
- For HP II, IID, III, IIID :	
-- 5 port 256K / 1MB (4S, 1P)	319/389
-- 10 port 256K / 1MB (10S)	449/519
- For HP 4, IIISI, Paint Jet XL300 :	
-- 7 port 1MB / 4MB (6S, 1P)	449/649
-- 10 port 1MB / 4MB (10S)	519/719
Pacific Page & 2MB (Postscript for HP II)	389
Pacific Page II / XL (Postcript for HP II)	719
Pacific Page 4 (Postcript for HP 4)	279
Pacific Page P.E.(HP IID,IIP,IIP+,III,IIID,IIIP)	279
Pacific Page P.E. & 2MB	405
Pacific Talk	179
Pacific Page PE XL (HP IIP, IIP+, III, IIID, IIIP)	
Postscript w. 2MB & accelerator board	719
Plotter in a Cartridge (HP II)	225
Plotter in a Cartridge P.E.	
- for HP IID, IIP, IIP+, III, IIID, IIIP	225

PELICAN All type ribbons	visit us

18. SCANNER

TAMARACK

ArtiScan Flatbed 24bit color 256 gray levels	
- w. Publisher 600/800/1200 dpi	845/1045/1695
- w. Pub. & OCR 600/800/1200 dpi	895/1095/1745
- w. Photostyler 600/800/1200 dpi.	995/1195/1845
- w. PhotoShop 2.5 600/800/1200	1045/1245/1895
HP ScanJet II w. Kit	795
HP ScanJet IIC Color w. Kit	1395
Slide Scan Kit (transparency, slide, X-ray)	
- 600/ 800/ 1200 dpi	525/525/595

MICROTEK

Scan Maker IIXE w. PhotoStyler	1150

Hand scanners........ see **Logitech** in # 14

E-TECH

4256G 256 gray scale (w.OCR)	99(115)
4200C 256/4096 color (w.OCR)	269(289)

19. TAPE BACKUP

COLORADO

DJ-10 (120MB) QIC-40 w. cable	145
DJ-20 (250MB) QIC-80 w. cable	179
- AB-11 Ext tape port	45
- Cable (2 Floppies & tape back up)	9
- FC-10 Controller	95
- KE-09 Ext Kit w/o controller	75
- TC-15 controller w. data compression	195
- Unix/ Xenix driver for DJ-10, 20	99
PowerTape PT-25 2GB 300KB/s Int	965
PowerTape PTE-25 Ext	1095
PowerTape PT-50 4GB 300KB/s Int	1525
PowerTape PTE-50 Ext	1655
Trakker 250MB Ext (printer port)	339
Trakker 120MB Ext (printer port)	299

HILITE (Archive s/w included)

California 250MB, 3.5", 1" ht.	155

IOMEGA

Tape 250MB insider, 3.5", 1"ht.	179

MICRO SOLUTION

250MB Ext (printer port)	329

SUMMIT

SE250 250MB w. Central Point Backup	169

20. VGA CARDS

Hauppauge Win/TV-02 (122 channel tuner)	450
- Adapter Cable / S-Video Kit	52/85
INTEL Smart Video Recorder	535
Paradise Window Accel 31X 1MB	159
Standard 24 VLB 1MB	105
Video Plus (video image grabber)	269
(All cards 1024x768 except as stated)	
CGA / MGP card (Monographic w. Printer)	29
ET4000 Tseng Lab 1MB	89
ET4000 Tseng Lab VLB 1MB	119
Oak067 Super VGA 512K	52
Oak077 Super VGA 1MB	65

AMI

FastView EISA VGA Graphics 1MB	269
FastView P9000 VLB 2MB	395

ATI

VGA Stereo 512K w. speakers	175
Wonder XL 24 1MB, Hi-color, w. mouse	145
Graphics Ultra Plus 2 (DRAM)	239
Graphics Ultra Plus 2 (DRAM) w. mouse	269
Graphics Ultra Pro 2MB w. mouse	369
Graphics Ultra Pro 2MB (VRAM) VLB	355
Graphics Ultra Pro 2MB EISA	475

DIAMOND

Stealth 1MB (VRAM) w. Sierra Hi-color	199
Stealth 24 1MB (DRAM),16 million color	175
Stealth 24 1MB (DRAM), VLB	179
Stealth Pro (VRAM) 1MB / VLB	255/265
Stealth Pro (VRAM) 2MB / VLB	355/365
Viper VLB P9000 (VRAM) 2MB	395

MYLEX

GLE911 1MB, 1280x1024, EISA	399
GXE020B 4MB (DRAM), 1280x1024, 2MB VRAM, TMS34020, Tiga/EISA	1039

NUMBER NINE (TI34020)

#9 GXe 1280 x 1024, 90Hz, S3-928 chip	
- Level 10 VRAM ISA 1MB	285
- Level 11 VRAM ISA 2MB	385
- Level 11 VRAM VLB 2MB	395
- Level 12 VRAM ISA 3MB	495
- Level 12 VRAM VLB 3MB	495
GXI Lite L20 TIGA,WIN, 1280-16color	565
GXI Lite L21 CAD, WIN, 1280-16color	725
GXI Level 24 CAD, WIN, 1280x1024-256	1279
GXI TC-Level 29, 24 bit 1280x1024-265K color at 72Hz,4MB (VRAM) 1MB (DRAM)	1495

ORCHID

Fahrenheit VA/ VLB, w.voice annotation,24 bit	199
Fahrenheit VLB, VESA 1MB 24bit	159
Fahrenheit 1280+ (DRAM) 1MB	155
Ce lcius VLB 1MB	235
Fahrenheit P9000 VLB 3MB	359
ProDesigner IIs 1MB, w. Hi-color	145

III SOFTWARE

1. CD SOFTWARE

GROUP A

Choose any 5 titles for $99 or $25 each

American Business PhoneBook 92
Atlas US President
Audubon's Birds
Audubon's Mammal
CD Story Time
Desert Storm
Discis : Kids Can Read
- Cinderella
- Heather Hit her First Home Run
- Long Hot Day at the Ranch
- Moving Gives Me Stomach Ache
- Mud Paddle , - Paper Bag Princess
- Tale of Benjamin Bunny , - Tale of Peter Rabit
- The Scary Poems for Rotten Kids
- Thomas Swimsuit

Great Cities I / II
Family Education Collection
King Quest V
Mixed-up Mother Goose
Multimedia Music Training
National Parks
Pheonix Shareware
Sherlock Holmes I
Sports Best
Stellar 7
The Animals
The Adventure of Willy Beamish
Time Table of History
Who Kill Sam Rupert

GROUP B

Choose any 4 titles for $99
Choose any 3 titles for $79 or $29 each

Arthur's Teacher Trouble (oem)
Atlas Pack (World + US) - DOS
Battle Chess (DOS)
Business Background
Chess Master 3000 MPC
Dinosaur Adventure
Edcuation Gameland (K-6 grade)
Family Choice
Jets and Props (Media clips)
Jones in the Fast Lane
LOOM
Media Music Shop

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Reference Library
Secret Weapons of the Luftwaffe
Space Quest IV - Roger Wilgo (oem)
Sleeping Beauty w. box
Space Adventure
The Animals MPC

GROUP C

Choose any 3 titles for $89 or $35 each

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CD Fun House (350 games)9
CD Game Pack II (10 games)
Electronic Library of Art (Western Arts)
Encyclopedia of ClipArt (Power Pack)
Golden Immortal
Hound of Baskervilles
Laser Printer Companion
Macromedia ACTION! WIN
Mammals (National Geographic)
Mario is Missing + World Atlas
Master Piece Library
Mavis BeaconTeaches Typing MPC
Mayo Clinic Family Health Book
Night Owl 8 (Shareware)
Publish It
Talking Class Tales
Talking Jungle Safari
The Family Doctor
Timetable of Arts & Entertainment
US Atlas w. Auto Map
Where in the World is Carmen Sandiego
Wing Commander w. Ultima 6

GROUP D

Choose any 3 for $99 or $39 each

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Corel Artshow 3 (Book + CD)
Bible Library (oem)
Composer Quest
Dictionary of Living World
Electronic Home Library
Encyclopedia (Grolier's DOS 5.01)
Essential Home & Business Collection
Greatest Books Collection / for Win
Languages of the World
Shareware Gold II
US History

SPECIAL GROUP

$19 each, Buy 5 Get 1 Free

Audio I (shareware)
Barney Bear Goes to School
Barney Bear Goes to Space
Beauty and The Beast / w. box/35
Business Master (Shareware)
Chestnut:
- Bible & Religion , - Clip Art Goliath
- Colossal CookBook
- Death Star Arcade Battles
- Dictionary & Language
- Encyclopedia of Sound
- Shareware Overload
- Technotools (Programming)
- The Complete Book Shop
- World Traveler

Education Master (Shareware)
Graphics I (shareware)
Peter and the Wolf / w. box/35
Rom Man Technologies : (w 3-D hologram)
- Brain Drain , - Futura
- Let's Play , - Mirror-Mirror
- Oldies but Goodies , - Variety Store

Sleeping Beauty (oem)
empra Access Photo CD (DOS, color)
US Atlas (MPC) or World Atlas (MPC)

UNDLE

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Compton's Multimedia Encyclopedia for WIN	
uinness disk of Record MPC	
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ime Table of History - Science	
Wing Commander w. Ultima 6	
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he Animals	
ecret Weapons of the Luftwaffe	
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oftware Library (3 titles)	49
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Mathematical Tempra	

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- upgrade	99
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Day of the Tentacle - Maniac Mansion	55
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Dinosaur Adventure / w. box	35/49
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Grammy Awards	45
Great Literature (1896 books)	49
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Guinness Disc of Record / w. box	29/35
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History of the World (oem)	(59)/325
JAZZ of Multimedia History	69
Just Grandma and Me	39
Kodak Photo CD Access (DOS & WIN)	35
Learn to Speak Spanish	69
MacMillan Dictionary for Children (K-12 grade)	45
Microsoft CINEMANIA	55
Microsoft ENCARTA	245
Microsoft Multimedia Beethoven 9th Symphony	55
Microsoft Multimedia Bookshelf / 1993	45/125
- upgrade to 1993	49
Microsoft Musical Instruments	55
Microsoft Works MPC	45
Monarch Notes (over 2000 study guides)	49
Monster Disk II (2 shareware disk)	49
MPC Wizard (test & tune-up for Win)	15
Multimedia Animals Encyclopedia	55
Multimedia Encyc. (Grolier's WIN 1.5)	45/225
Nautilus BackPac (6 disk)	55
New Basics Electronic CookBook	45
Oxford English Reference Library	99
PC SIG Library vol.11	45
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Type Set: Spreadsheets & Graphs	75

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Generic 3D (special)	(179)
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C++ for OS/2	149
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(paradox + quattro pro +wordperfect)	379
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1-2-3 Rel 3.1+ for DOS / Rel 3.4 single	385
1-2-3 for DOS upgrade	105
Ami Pro for WIN 3.01	239
- competitive upgrade	99
Freelance Graphic	299
- upgrade for DOS/WIN	99
Lotus Organizer (special)	(99)
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- competitive upgrade	189
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- upgrade	45
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- Word for Windows upgrade	125
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- upgrade to WIN 5.2 from DOS	85
- competitive trade up 5.2 for WIN	105
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- Freehand 3.1 for WIN	379
- PageMaker 5.0 for WIN	525
- Persuasion 2.1 for WIN	325
- Photostyler 1.1 for WIN	515
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- upgrade / CD version	105/89
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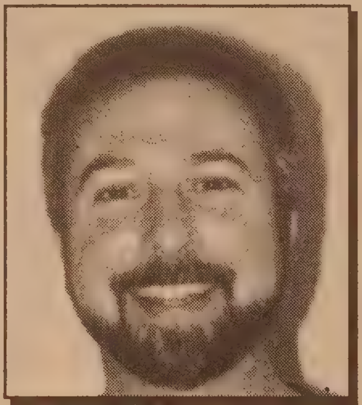
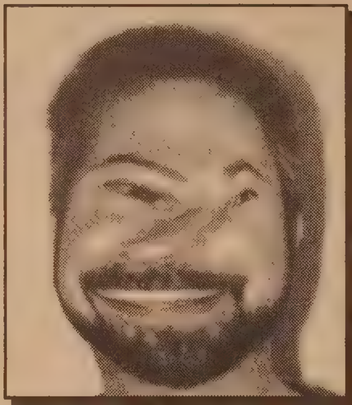
Educational Software & Games (on sale) ■



Before



After

direction. You can work on low-res copies of your files and then apply all the effects you've worked out to the original high-res version of the file. Flo' handles anti-aliasing to eliminate any artifacts created during the distortion process. You can output animations of a distortion as PICS or as a series of PICT files.

Flo' is easy to learn. I created my first distorted file within fifteen minutes of loading Flo', and was creating animations within an hour. The program offers unlimited undoes, and takes a rather unique approach to the entire process of undoing. Since Flo' stores the instructions for a series of distortions apart from the file they effect, you can apply the same series of distortions on different files if you so desire.

There are still a few rough edges in Flo'. The documentation is sparse and I had more than one glitch in working with the animation functions. The VALIS group is working aggressively to resolve any problems with the program. Flo' should be a part of any special effects tool chest for Macintosh artists. (The VALIS Group, PO Box 422, 1001 W. Cutting Blvd., Point Richmond, CA 94807)

KIDDESK

Designed By: Donna Stanger, Tad Wood, Paul Elseth, Scott Clough
Published By: Edmark
For: Macintosh (System 6.07 or later, 1MB monochrome, 2MB color)
List Price: $39.95
Reviewed By: Mike Markowitz

The Macintosh Finder is a wonderfully flexible tool for managing disks and files, but the furniture of the Desktop can be confusing to a beginner, and a user who gets lost in the Finder can make a terrible mess of someone else's carefully arranged icons and folders. This is particularly true when kids share computers with grown-ups. The conventional solution is to create password-protected hard disk partitions for everything you don't want the kids to see. This is inconvenient when you forget the password, and horrendous if the partition table ever gets corrupted.

Apple offers a $59 alternative to the Finder called At Ease, a "safe, friendly desktop" that avoids the troublesome concept of subdirectories (file folders) by displaying all

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WIT ISA 486DX-50/DX-33 w/256K Cache	$1310/$1170
WIT ISA 486SX-33/SX-25 w/256K Cache	$1040/$1020
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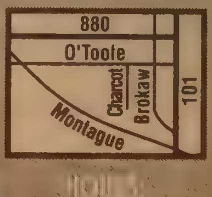

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Prices Subject To Change W/O Notice. 30 Day Money Back Guarantee Only For Products That Are Incompatible With Your Software.

your applications on one screen and all your documents on another. KidDesk is even simpler, cheaper, and graphically less austere. It also does not require System 7—an important consideration for users with older Macs.

KidDesk can be run as a startup application, in effect, replacing the Finder. The opening screen displays a button for each user. The default user is "Guest" but you can add additional named users. For each user you configure a set of applications will appear as big icon buttons on that user's KidDesk desktop. Only those applications are accessible to the user.

There are also several sets of "desk accessories," in different styles, including a picture frame (where you can insert any graphic, such as a scanned photograph of the kid), a clock (analog and digital), a simple calculator, a voice recorder, and a telephone (which plays back the last message left on the recorder). There is an excellent monthly calendar, which can be customized with "stickers" and text notes and printed out. The program's use of sound is very effective—for example when you click on the digital clock the program "speaks" the time.

The program comes on a single 800K floppy disk and takes up 982K of hard disk space after installation. The 40-page manual is clearly organized and well illustrated.

KidDesk is a good solution for home computers shared by kids and adults. It could also be used effectively in schools where several classes or teachers must share a single Mac. (Edmark, Inc., PO Box 3218, Redmond, WA 98073. 206/556-8484)

MAVIS BEACON TEACHES TYPING, VERSION 2.0

Programmed By: Scott Daley, Bryan Lerda, and David Rudolph

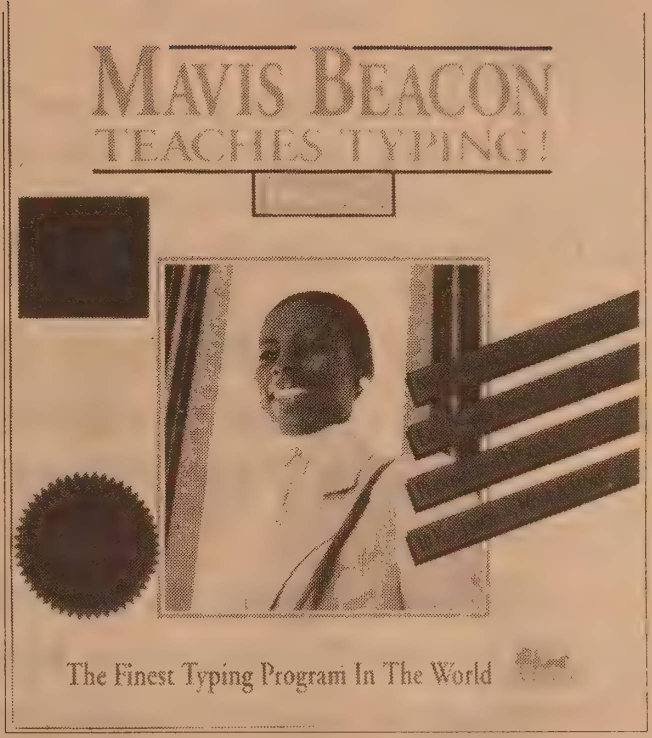
Designed By: Mike Duffy, Norm Worthington, Walt Bilofsky, and Glenn Wichman

Published By: Software Toolworks

For: Macintosh (Plus or later, System 6.0.7 or higher, supports 16 or 256 colors, requires about 1.8MB of RAM and about 3MB of hard disk space)

List Price: $49

Reviewed By: Mike Markowitz



As long as text remains our dominant form of communication, the keyboard will be the greatest barrier between people and computers. In the English-speaking world, history has burdened us with a keyboard layout of sickeningly poor design. In 1872 the inventor of the first successful typewriter, Charles L. Sholes, arranged the letters so that common combinations of letters were far apart, reducing the chance that fast typing would cause the clumsy metal type bars to collide and jam the machine. Today, however, even the slowest computer can accept keyboard input faster than even the nimblest fingers can pound it out. Attempts to replace the irrational QWERTY layout with alternatives like the efficient Dvorak keyboard ran up against the tyranny of the installed base and the vast inertia of individual and corporate habit.

For the novice Macintosh user, obliged to keep one hand free for the mouse, high-speed touch typing may seem like an impossible goal. Nevertheless, if you want to improve the productivity of the time you spend at the computer, a good typing tutorial program is the best investment you can make. For Macintosh users, the best is still Software Toolworks' Mavis Beacon Teaches Typing, newly updated with spiffy color graphics and special exercises for the numeric keypad.

Like Betty Crocker, Mavis Beacon is an imaginary character who never actually appears in the program. But she's always watching over your shoulder, recording every keystroke with electronic precision. The program is not just a series of canned exercises. It analyzes your performance and errors, adapting each new lesson to your individual needs.

To maintain interest, many of the lessons are drawn from a database of facts, riddles, and jokes, plus the *Guiness Book of World Records*. There is also an auto racing game, in which your typing rate determines the speed of your vehicle. You can customize the lessons and the display in many different ways, and there is extensive online Help. The program can keep track of multiple users by name.

The program is easily installed from compressed files on two 800K disks. The 76-page manual includes a history of typewriting, a discussion of keyboard basics and business letter formats, and a short

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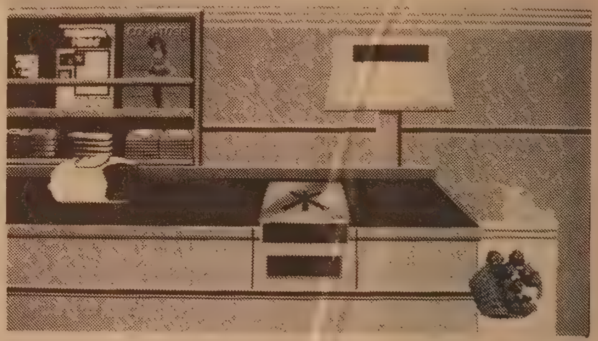
bibliography. There is also a very readable technical explanation of the artificial intelligence routines that drive the program.



Studies indicate that about an hour a day is the optimum for typing practice. If a computer is important in your life, you should seriously consider spending that hour with Mavis. (Software Toolworks, Inc., 60 Leveroni Court, Novato, CA 94949. 415/883-3000)

MACINTOSH HARDWARE REVIEW

QUADRALINK DMA

Manufactured By: Applied Engineering
List Price: $499
Reviewed By: Matthew Leeds

It's easy to run out of serial ports on a Mac. By the time you hook up a standard printer, label printer, MIDI device, modem, sound digitizer, graphics tablet, and a couple of VCRs you're way past the two serial ports Apple provides. If you want to run a multiline BBS, do video editing, or anything else that requires lots of serial ports, you should consider the QuadraLink DMA card from Applied Engineering.

The QuadraLink card fits in any NuBus slot and supplies four additional serial ports. The card is controlled via the provided AE Shadow control panel. Shadow lets you assign Communication Toolbox (CTB) aware applications to any available QuadraLink serial port. It also lets you "shadow" the modem or printer port. This means that a device connected to a QuadraLink port thinks it is connected to one of the Mac's original serial ports.

A utility is included to modify the driver for a Wacom tablet that lets you connect this popular graphics tablet to a QuadraLink port without shadowing it. An optional product, ShadowLAN, allows users to share QuadraLink ports across a network.

While not all products will work with the QuadraLink (this mostly depends on whether their software is CTB aware), I was able to get a modem (using ClarisWorks), HP DeskJet printer (using GDT PowerPrint printer drivers), and a Wacom tablet all working simultaneously while still leaving my Mac's two original serial ports free for use with a MacRecorder and camcorder (using two applications that do not support the CTB). I still had a free port on the QuadraLink. The hardware and software works flawlessly. (Applied Engineering, Inc., 3210 Beltline, Dallas, TX 75234. 214/241-6060)

AMIGA SOFTWARE REVIEWS

AMI-BACK TOOLS

Published By: Moonlighter Software Development
List Price: $79.95
Reviewed By: Douglas J. Nakakihara

Ami-Back Tools (ABT) is for maintaining, organizing, repairing, and recovering data on hard or floppy disks. ABT operates on any SCSI drive, but will also work on the A4000's IDE drive.

As long as nothing has been written over the old data, it is possible to restore a deleted file. The Reviver module will search through a drive and allow you to restore files. The Analyst module will correct checksum or validation errors. For a disk that no longer comes up as an AmigaDOS device, the 911-Recovery module will copy the files, with optional compression, to another device, including floppy drives. Once the drive is fixed, perhaps by reformatting, the files can be restored to the original device. The General Practitioner is a disk optimization module. You can choose file, directory, and/or freespace optimization. Data is basically reorganized into contiguous blocks, improving disk access speed.

The Lab Test module creates a database of information about the files on the target drive. This can be saved and compared at a later time to a new database on the same device. This is useful for detecting possible viruses. Finally, the Antiseptic module will wipe out an entire device in a way that undeleting is generally not possible. A scheduling utility is included to run some of the modules automatically.

If you are using a hard disk, you need a program like Ami-Back Tools. However, it is no replacement for good backup habits. (Moonlighter Software Development, Inc., 3208-C E. Colonial Dr., Suite 204, Orlando, FL 32803. 407/384-9484)

WORDWORTH 2.0 AGA

Published By: Digita International Ltd.
List Price: $180
Reviewed By: Douglas J. Nakakihara

Wordworth is the most powerful all-around word processor available for the Amiga. Its features include header and footer support; spellchecker; thesaurus; mail merge; selectable time, date, and page numbering formats; custom screen format with AGA support; variable timed saves; paragraph sorting; print preview; online help; and automated index and table of contents building. Graphics can be saved with a document or linked to separate files, with full control of text flow, transparency, and stand off. The glossary is a handy feature that allows you to create a database of phrases which can be quickly inserted into your document. Bookmarks are wonderful for quickly finding your way around a document. The Insert Literal feature provides a means for entering characters not normally found on the keyboard, like foreign characters. With the "mixed" paragraph formatting options you can globally change certain text attributes without affecting others.

Wordworth comes with seventeen Agfa Compugraphic fonts and also supports PostScript. Some internal printer fonts can also be accessed for a vast array of printers. I liked the "Quick Screen" feature, which temporarily replaces the proportional screen fonts with a fixed-spaced font, for faster screen updates and better legibility.

The program's shortcomings include slow nonstandard requestors and a blocky-looking interface. ARexx support is surprisingly absent. Also, Wordworth's support for other wordprocessor file formats needs work. Complaints aside, Wordworth is a superb word processor. (Digita International Ltd., Black Horse House, Exmouth Devon, EX8 1JL, England. 011-44-395-270273)■

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RESOURCES:

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Minneapolis, MN 55404
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Fax: (612)874-3732
Email:
roman@kitchen.mcad.edu or
joan_klaiber@macmail.mcad.edu

Inter-Society for the Electronic Arts
ISEA Board
PO Box 60103
9703 BC Groningen
The Netherlands
Email: isea@rug.nl

reality environments created by artists, sensory robotics, interactive video, artists' software, telecommunications art, electronic music and performance, interactive installations, image manipulation and generation in graphic prints and video. This range of approaches was represented on an equally diverse range of hardware and software—from custom software running on a Silicon Graphics Crimson to Macintosh II computers with a laser disc player, 386SX notebook with its 2400bps modem, to Amiga computers. Corporate assistance to TISEA in the form of hardware came from Silicon Graphics, Apple, Commodore, Sony, Softimage, Inc., Philips, and Pioneer. These are just a small sampling of the works we saw; which are in turn a sampling of the whole:

- Digital paintings, Achameleh Debela (Ethiopia)—richly colored images based on Ethiopian/African symbols, motifs, masks and figures are created using POST (image processing software written by Jeffry Light at the Advanced Computing Center for the Arts and Design of The Ohio State University) and ACCADtools on a Sun Microsystem SPARC-2. Debela describes the images as being "visual vessels of a continuum."

What does telecommunications mean for the culture of the Australian aboriginals, for whom meaning and identity is rooted in the earth?

- Breath, Ulrike Gabriel (Germany)—Originally, custom designed for the SGI Iris. Breath was displayed at TISEA on what was said to have been the only Crimson computer in the southern hemisphere. Breath employs a Reality Engine to create what Gabriel calls "a temporal stethoscope." The user straps on a sensor belt which measures breath; the oscillation of breath triggers undulating patterns of image and sound on a wall-sized screen. The resulting image looks like an infinitely complex, shifting, rustling weaving of paper. According to Gabriel, the visualization enables users to regulate their breath.
- The Power of Suggestion, Paul DeMarinis (USA)—"songs for synthesized voice." DeMarinis uses the melodic patterns of spoken words and texts as the basis of compositions which are run through a process of computer analysis and resynthesis into music for electronic instruments. In The Power of Suggestion, DeMarinis performs with a hacked Power Glove that "enables the hand to manipulate the audience by singing/signing the voice of the hypnotist."
- Bicycle TV, Nancy Paterson (Canada)—an exercise bicycle that drives an interactive videodisc; as you ride the bike, you navigate the scenic roads of an electronic maze. It wouldn't be surprising to see such things mass marketed before too long; it's one way to not get bored while using an exercise bike. Paterson also considers the maze to be a metaphor for the challenges and opportunities offered by new technologies.
- A Memory Project, Henry See (Canada)—a Macintosh HyperCard stack about memory and forgetfulness. During the course of interacting with the piece, you begin to notice the computer is "forgetting" things: menu options disappear.
- Host Body/Coupled Gestures: Event for Virtual Arm, Scanning Robot & Third Hand, Stelarc (Australia)—Stelarc's body is the site for an integrated human/electronic performance. A data glove on one of Stelarc's hands sends finger flexion and position data to a computer-generated "manipulator" that not only functions like an arm in virtual space, but extends human performance: it has continuous wrist and finger rotation, infinite stretching, and grafting. On his other arm is a robotic Third Hand that is activated by EMG abdominal and leg muscle signals. Sensors connected to various parts of Stelarc's body track EMG signals, acoustically "amplifying" the internal functions of his body; mercury switches on Stelarc's arms allow his body to become a video switcher. An IRB 2000 robot arm towers over Stelarc, with a camera attached, circling and scanning his body.
- Space Over Time, Tim Gruchy (Australia)—Says Gruchy, "The passive experience of the art observer is no longer relevant... Space is now sensed but no less sensible." In "Space Over Time," Gruchy uses Mandala software in the creation of a projected user-interactive wall-sized screen. As a user gestures towards shapes on the wall, new visual patterns emerge. Unlike smaller interactive pieces, your whole body gets involved in altering and responding to the patterns. We found ourselves dancing...after we pulled ourselves away, a middle-aged man who'd been watching us like we were crazy, stepped in front of the wall. Soon he was dancing too.
- Portrait One, Luc Courchesne (Canada)—employing an interactive videodisc, monitor, and HyperCard stack, Portrait One features a reflected image of a woman with whom you can converse in French, English, and German. Depending on her moods and your curiosity, the conversation will range from superficial to intimate.
- Cultures in Cyberspace—an open participation virtual panel to address the development and impact of artistic and cultural activity on computer networks on the following systems: American Indian Telecommunications/Dakota BBS (USA); ArtsNet (Pegasus, Australia); Arts Wire (The Meta Network, USA); USENET (International); The WELL (USA). Organized by Anna Couey in collaboration with George Baldwin, Phillip Bannigan and Sue Harris, Anne Fallis, Judy Malloy, Joe Matuzak, John S. Quarterman, Randy Ross, and Eric S. Theise. Cultures in Cyberspace was designed for local discussions which were ported and responded to by other participating nodes via USENET. In addition to the ensuing discussion, the process of organizing the project articulated the relativity of artists' access to "global" networks, and the variability in general of international network functionality, connectivity, and participation.

TOWARD THE FUTURE

The Fourth International Symposium on Electronic Art is organized by Roman Verostko at the Minneapolis College of Art and Design, and will take place in Minneapolis from November 3–7, 1993. Its theme is "The Art Factor." A preliminary schedule has been released. For further information contact: Roman Verostko or Joan Klaiber, FISEA 93, Minneapolis College of Art and Design. ■

RESOURCES

Calendar Of Events

CONFERENCES, SHOWS, AND OTHER SPECIAL EVENTS

JULY

July 24 Computer Show & Sale. San Mateo Expo Center. Richard James. Call: 1-800-685-1400.

July 25 The Computer Show & Sale. Hayward Centennial Hall. MarketPro. Call: (415)388-8893.

July 27 IICS Human Interface SIG Meeting. San Francisco. Medius IV. Call: (415)905-6959.

July 31–August 1 Computer Show & Sale Featuring How To Buy, Build, Or Upgrade Your PC Seminar. Cow Palace. Richard James. Call: 1-800-685-1400.

AUGUST

August 1–6 SIGGRAPH '93. Chicago. ACM. Call: (312)321-6830. Email: info92@siggraph.org.

August 3 Genetic Programming: A Presentation By Dr. John Koza. San Jose. Computer Literacy Bookshops. Call: (408)435-1118.

August 3–5 Downsizing Expo. Santa Clara. Smith & Shows. Call: (508)470-3870.

August 3–5 OP/EN Conference & Exposition. Santa Clara. DCI. Call: (508)470-3880.

August 7 Computer Show & Sale Featuring How To Buy, Build, Or Upgrade Your PC Seminar. Oakland Coliseum. Richard James. Call: 1-800-685-1400.

August 8 The Computer Show & Sale. Marin Civic Center. MarketPro. Call: (415)388-8893.

August 8 Computer Show & Sale. Rancho Arroyo Sports Complex, Sacramento. Richard James. Call: 1-800-685-1400.

August 9–12 Groupware '93 Workgroup Solutions Conference And Expo. San Jose. The Conference Group. Call: 1-800-247-0262.

August 14 The Computer Show & Sale. Sonoma County Fairgrounds. MarketPro. Call: (415)388-8893.

August 14–19 SCO Forum '93. Santa Clara. Smith & Shows. Call: 1-800-553-9939.

August 15 Computer Show & Sale. Alameda County Fairgrounds, Pleasanton. Richard James. Call: 1-800-685-1400.

August 15 The Computer Show & Sale. Centre Concord. MarketPro. Call: (415)388-8893.

August 21 Computer Show & Sale Featuring How To Buy, Build, Or Upgrade Your PC Seminar. Cow Palace. Richard James. Call: 1-800-685-1400.

August 22 The Computer Show & Sale. Scottish Rite Center, Sacramento. MarketPro. Call: (415)388-8893.

August 23–25 ABCD's Breakaway '93 Conference. San Francisco. ABCD. Call: (601)977-9033.

August 23–25 VAR Support '93 Conference. Santa Cruz. Mikael Blaisdell & Associates. Call: (510)865-4515.

August 23–27 INTEROP 93 Conference. San Francisco. Interop Co. Call: (415)941-3399.

August 24–25 Home Office Technology Conference And Exposition. San Jose. Future Expositions. Call: (408)369-7744.

August 28 Computer Show & Sale. Santa Clara County Fairgrounds. Richard James. Call: 1-800-685-1400.

August 29 The Computer Show & Sale. Marin Civic Center. MarketPro. Call: (415)388-8893.

August 31 IICS Human Interface SIG Meeting. San Francisco. Medius IV. Call: (415)905-6959.

SEPTEMBER

September 5 Computer Show & Sale. Alameda County Fairgrounds, Pleasanton. Richard James. Call: 1-800-685-1400.

September 9–11 CompuExpo '93. Las Vegas Convention Center. UNSC Investment Group. Call: 1-800-822-1229.

September 11–12 Computer Show & Sale Featuring How To Buy, Build, Or Upgrade Your PC Seminar. Oakland Coliseum. Richard James. Call: 1-800-685-1400.

September 13–14 Network Outlook '93

Continued

AUGUST 8

ACTIVISM ONLINE

Modern Times Bookstore, San Francisco

Cyberspace Literacy series presents an evening of Activism Online: Global Communications at PeaceNet, EcoNet, LaborNet, and ConflictNet. Howard Fredrick, author of *Global Communications & International Relations*, and Michael Stein, from the Institute for Global Communications (IGC), will demonstrate and discuss the IGC networks, and offer strategies for online activism. Sunday, August 8, 7:30 pm, $3–5 sliding scale. Modern Times Bookstore, 888 Valencia, San Francisco. Call Modern Times at (415)282-2946.

AUGUST 9–12

GROUPWARE '93: WORKGROUP SOLUTIONS CONFERENCE

San Jose Convention Center

The GroupWare '93 conference will focus on the commercial aspects of groupware and workgroup technology. Featured speakers include Steve Jobs, CEO, NeXT; John Landry, Chief Technical Officer, Lotus; and Philippe Kahn, CEO, Borland. The conference features more than eighty sessions addressing various groupware issues. More than one hundred vendors will be on hand to display the latest in email, shared memory and databases, and other groupware solutions. Call: The Conference Group, 1-800-247-0262.

AUGUST 14–28

HANDS-ON MULTIMEDIA INTEGRATION WITH HYPERCARD

San Francisco

Zakros InterArts is offering a Hands-on Multimedia Integration With HyperCard class, beginning Saturday August 14, and continuing August 21 and 28 from 10:00 am to 5:00 pm. The course, taught by HyperCard software designer and multimedia artist Gerry Burnett, will cover the intricate process of multimedia production: interface design, building a collaborative team, project management, and quality assurance. The course will also cover the incorporation of QuickTime digital video, laserdisk video control, MIDI, CD and digital audio, animation, and color in HyperCard stacks. Call: Zakros InterArts, 614 York St., San Francisco, (415)282-5497.

Calendar Of Events continued

Conference. San Francisco. Technologic Partners. Call: (212)696-9330.

September 16–18 Windows Solutions Conference And Exposition. Santa Clara. Seybold Seminars. Call: 1-800-433-5200.

September 18 Computer Show & Sale. Santa Clara County Fairgrounds. Richard James. Call: 1-800-685-1400.

September 19–23 INTEREX Hewlett-Packard Computer User Conference & Expo. San Francisco. INTEREX. Call: 1-800-INTEREX.

September 21–23 Mobile World Conference And Exposition. San Jose. DCI. Call: (508)470-3880.

September 25 Computer Show & Sale Featuring How To Buy, Build, Or Upgrade Your PC Seminar. Cow Palace. Richard James. Call: 1-800-685-1400.

September 28–29 Electronic Book 1993 Conference And Exhibition. New York. Mekler. Call: 1-800-632-5537.

OCTOBER

October 26–28 Common Desktop Environment Developers Conference. San Jose. UniForm Association. Call: 1-800-225-4698.

October 26–28 COSE Developers Conference. San Jose. Smith & Shows. Call: (508)879-6700.

CLASSES, SEMINARS, AND WORKSHOPS

JULY

July 24 Adobe Illustrator I Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 24 Enterprise Information Systems For The Legal Profession Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 25 A Beginners Guide To Telecommunications On The Mac Course. San Francisco. Media Alliance. Call: (415)771-7133.

July 26 Intermediate Word For Windows Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 26 Lotus Macros And WYSIWYG Class. Oakland. California Computer Options. Call: (510)444-5700.

July 26–27 Local Area Networks: LANtastic To Novell Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

July 26–27 One-Write Plus 3.0 Accounting Class. Oakland. North Bay Bookkeeping and Business Services. Call: (707)746-8315.

July 26–30 Fuzzy Logic Inference Systems Course. San Francisco. Intelligent Inference Systems Corp. Call: (408)730-8345.

July 27 Intermediate Excel Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 27 Mac Basics Level I Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 27 WordPerfect For Windows Class. Oakland. Action Computer Training Institute. Call: (510)562-5511.

July 27–28 Access For Windows Class. Walnut Creek. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 27–28 Microsoft Project For Macintosh Class. Walnut Creek. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 28 Beginning Freehand Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 28 Intermediate Paradox Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 28 Intermediate Paradox For Windows Class. Emeryville. Northwest Computer Systems. Call: (510)653-0808.

July 28 Intermediate WordPerfect Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

July 28 Intro To UNIX Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 28–29 One-Write Plus 3.0 Accounting Class. Oakland. North Bay Bookkeeping and Business Services. Call: (707)746-8315.

July 29 Advanced Windows Class. Oakland. California Computer Options. Call: (510)444-5700.

July 29 Beginning FileMaker Pro For Windows Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 29 Intro To Windows 3.1 Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 29 Networking For Small Offices Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

July 29 PageMaker II Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 29–August 12 Computer Media Fundamentals Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

July 30 Beginning Illustrator Class. San Francisco. New Horizons Computer Learning Center. Call: 1-800-999-9654.

July 30 FreeHand I Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 30 Intermediate WordPerfect 5.1 Class. Oakland. California Computer Options. Call: (510)444-5700.

July 30 Windows For Workgroups Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

July 31 Adobe Illustrator II Class. San Francisco. Media Alliance. Call: (415)771-7133.

July 31 Build & Upgrade An IBM PC Clone Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

July 31 Fundamentals Of Network Technologies For The Legal Professional Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

AUGUST

August 1–8 FrameMaker Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 2 Mac Basics Level I Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 3 Build & Upgrade An IBM PC Clone Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

August 3 Mac Basics Level II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 3 Networking For Small Offices Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 3–6 Intermediate AutoCAD Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

August 3–September 23 AutoCAD Level II Class. Santa Clara. The Cooper Connection. Call: (408)970-9383.

August 4–11 Director 2 Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

August 5 Ten Things You Should Know Before You Automate Your Business Accounting System Workshop. San Francisco. J.C. Lukrich & Co., CPA. Call: Beth Markus, (415)905-6900.

August 5 What Lead Tracking Or Contact Management Software Can Do For Your Business Workshop. San Francisco. J.C. Lukrich & Co., CPA. Call: Beth Markus, (415)905-6900.

August 5–6 Local Area Networks: LANtastic To Novell Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

August 5–26 PhotoShop Intensive Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 6 Advanced Time Line 5.0 Class. San Francisco. Symantec Professional Services. Call: 1-800-786-8620.

August 6 Beginning DOS Class. Oakland. California Computer Options. Call: (510)444-5700.

Continued

Calendar Of Events continued

August 6 FreeHand II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 6 NetWare 3.11 System Administrator Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

August 6–7 Email Writing For The Non-Native Technical Professional Seminar. Santa Clara. UC Extension. Call: (408)748-7379.

August 7 Fundamentals Of Network Technologies For The Legal Professional Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 9 Mac Basics Level II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 9 NetWare 3.11 Advanced System Administrator Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

August 9–10 Intro To The PC For CAD Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

August 9–10 PC Troubleshooting & Repair Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

August 9–12 Advanced Project Management Emphasizing Software Projects Seminar. Santa Clara. UC Extension. Call: (408)427-6636.

August 10 Beginning Windows Class. Oakland. California Computer Options. Call: (510)444-5700.

August 10 Intro To Local Area Networks Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 11 Beginning Lotus Class. Oakland. California Computer Options. Call: (510)444-5700.

August 11 Increasing Productivity With Multimedia Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 11 Intro To UNIX Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 11 Mac Basics Level I Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 11–13 AutoCAD 3D Intro Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

August 12 Beginning Word For Windows Class. Oakland. California Computer Options. Call: (510)444-5700.

August 12 Intro To Windows 3.1 Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 12 Networking For Small Offices Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 13 Beginners Windows 3.1 Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

August 13 Intermediate Word For Windows Class. Oakland. California Computer Options. Call: (510)444-5700.

August 14 Fundamentals Of Network Technologies For The Legal Professional Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 14 Mac Basics Level I (In Spanish) Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 14 & 28 PC Troubleshooting & Repair Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

August 14–28 Hands-on Multimedia Integration With HyperCard Workshop. San Francisco. Zakros InterArts. Call: (415)282-5497.

August 16 Adobe Illustrator I Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 16 Beginning WordPerfect 5.1 Class. Oakland. California Computer Options. Call: (510)444-5700.

August 16 PageMaker I Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 16 QuickMail User—Mac, Windows, And DOS Course. Berkeley. Network Frontiers. Call: Lynn Heiberger, (415)644-9400.

August 16–17 Time Line For Windows Class. San Francisco. Symantec Professional Services. Call: 1-800-786-8620.

August 17 Beginning PageMaker Class. Oakland. California Computer Options. Call: (510)444-5700.

August 17 Build & Upgrade An IBM PC Clone Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

August 17 Intermediate Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

August 17 Intro To Microsoft Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

August 17 QuickMail Administrator Level I Course. Berkeley. Network Frontiers. Call: (415)644-9400.

August 17–20 AutoCAD Workshop For Beginners. Santa Clara. The Cooper Connection. Call: (408)970-9838.

August 18 DOS Basics Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

August 18 Intro To Excel Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

August 18 Mac Basics Level II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 18–19 Network Configuration Management Course. Berkeley. Network Frontiers. Call: (415)644-9400.

August 18–September 8 Interactive Media Production 1 Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

August 19 Advanced Windows Class. Oakland. California Computer Options. Call: (510)444-5700.

August 19 Intermediate Excel Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

August 19 Ten Things You Should Know Before You Automate Your Business Accounting System Workshop. San Francisco. J.C. Lukrich & Co., CPA. Call: Beth Markus, (415)905-6900.

August 19 What Lead Tracking Or Contact Management Software Can Do For Your Business Workshop. San Francisco. J.C. Lukrich & Co., CPA. Call: Beth Markus, (415)905-6900.

August 19–20 PC Troubleshooting & Repair Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

August 19–20 Q&A 4.0 Class. San Francisco. Symantec Professional Services. Call: 1-800-786-8620.

August 19–26 Macintosh Basics Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

August 20 Advanced Windows 3.1 Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

August 20 Intro To Computers Class. Oakland. California Computer Options. Call: (510)444-5700.

August 20 Presentation Creation And Macros With Excel Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

August 21 Fundamentals Of Network Technologies For The Legal Professional Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 21 Mac Maintenance And Troubleshooting Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 21 System 7 Workshop. San Francisco. Media Alliance. Call: (415)771-7133.

August 22 Mac Basics Level I Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 23 Adobe Illustrator II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 23 Beginning Excel Class. Oakland. California Computer Options. Call: (510)444-5700.

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HI-TECH USA

(408) 262-8688 Milpitas
(415) 508-8688 San Carlos

SYSTEM	M/B + CPU	* BASIC SYSTEM	BASIC SYS +40MB HDD + 14" MONO & MGP CARD	BASIC SYS + 40MB HDD + VGA CARD & MONITOR	BASIC SYS + 40MB HDD + SVGA CARD & MONITOR	BASIC SYS +80MB HDD + SVGA CARD & MONITOR	BASIC SYS +120MB HDD + SVGA CARD & MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +130MB HDD +SVGA CARD & MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +170MB HDD +SVGA CARD & MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +200MB HDD +SVGA CARD & MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +250MB HDD +SVGA CARD & MONITOR	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +340MB HDD +SVGA CARD & MONITOR
486SLC2-66/64C VLB	$344	$504	$700	$804	$832	$878	$888	$1,064	$1,084	$1,104	$1,134	$1,204
486SLC2-50/64C VLB	294	454	650	754	782	828	838	1,014	1,034	1,054	1,084	1,154
486DX2-66/128C VLB	574	734	930	1,034	1,062	1,108	1,118	1,294	1,314	1,334	1,364	1,434
486DX-50/128C VLB	508	668	864	968	996	1,042	1,052	1,228	1,248	1,268	1,298	1,368
486DX-33/128C VLB	374	534	730	834	862	908	918	1,094	1,114	1,134	1,164	1,234
486DX2-66/256C EISA	648	808	1,004	1,108	1,136	1,182	1,192	1,368	1,388	1,408	1,438	1,508
486DX-50/256C EISA	558	718	914	1,018	1,046	1,092	1,102	1,278	1,298	1,318	1,348	1,418
486DX-33/256C EISA	428	588	784	888	916	962	972	1,148	1,168	1,188	1,218	1,288
486DX2-66C ISA	534	694	890	994	1,022	1,068	1,078	1,254	1,274	1,294	1,324	1,394
486DX-50C ISA	494	644	840	944	972	1,018	1,028	1,204	1,224	1,244	1,274	1,344
486DX2-50C ISA	438	598	794	898	926	972	982	1,158	1,178	1,198	1,228	1,298
486DX-33C ISA	328	488	684	788	816	862	872	1,048	1,068	1,088	1,118	1,188
486DLC-40/64C ISA	198	358	554	658	686	732	742	918	938	958	988	1,058
486DLC-33/64C ISA	148	308	504	608	636	682	692	868	888	908	938	1,008
486SX-33C ISA	218	378	574	678	706	752	762	938	958	978	1,008	1,078
486SX-25C ISA	134	294	490	594	622	668	678	854	874	894	924	994
386DX-40/64C	114	274	470	574	602	648	658	834	854	874	904	974
386SX-40	88	248	444	548	576	622	632	808	828	848	878	948
386SX-33	74	234	430	534	562	608	618	794	814	834	864	934

*** BASIC SYSTEM CONFIGURATION:** Motherboard & CPU, 1MB memory installed, 1:1 2HD/2FD controller with 2S/1P/1G, 1.2MB or 1.44MB Floppy Drive, Internal Clock/Calendar, Enhance Case with Power Supply, and 101-Key Enhanced Keyboard.

Super Sale – Best Prices in Town!

DELUXE SYSTEMS

386SX-33	$828
386SX-40	838
386DX-40/64K	858
486SX-25/64K	908
486SX-33/64K	988
486DLC-33/64K	888
486DLC-40/64K	948
486DX-33/64K	1,088
486DX-40/64K	1,138
486DX2-50/64K	1,208
486DX-50/64K	1,228
486DX2-66/64K	1,298
486 DX-33/256K EISA	1,168
486DX-50/256K EISA	1,298
486DX2-66/256K EISA	1,368
486SLC2-50/64K VLB	1,048
486SLC2-66/64K VLB	1,098
486DX-33/64K VLB	1,098
486DX-50/64K VLB	1,238
486DX2-66/64K VLB	1,308

SYSTEM CONFIGURATION

- Motherboard w/CPU
- 4MB RAM 70NS
- 130MB Fast Hard Drive
- 1.2MB and 1.44MB Floppy Drive
- IDE 2HD/2FD Controller w/2S/1P/1G
- 512KB SVGA Card
- 14" SVGA .28 Color Monitor
- 101-Key Enhanced Keyboard
- Enhanced Case w/Power Supply

OPTIONS

• 80MB Hard Drive	Less $20
• 170MB Hard Drive	Add $20
• 200MB Hard Drive	Add $40
• 340MB Hard Drive	Add $140
• 14" Non-Interlaced Monitor	Add $30
• 15" Non-Interlaced Monitor	Add $140
• VLB IDE Controller	Add $40
• 16BIT SVGA Card w/1MB	Add $20
• Window Accelerator w/1MB	Add $30
• Orchid Fahrenheit 1280	Add $110
• Diamond S.S. Pro VLB w/1MB	Add $70
• Orchid Fahrenheit VLB w/1MB	Add $120
• 250MB Tape Back-up	Add $148
• 16BIT Ethernet Card	Add $58
• Deluxe Speakers	Add $10
• Mitsumi CD-ROM	Add $174
• Sound Blaster Pro Deluxe	Add $118
• CD ROM Upgrade Kit	Add $368

EISA (VLB) SCSI SYSTEMS

486DX-33/128K	$1,598
486DX2-50/128K	1,698
486DX-50/128K	1,738
486DX2-66/128K	1,798

SYSTEM CONFIGURATION

- Intel Pentium Technology Ready
- 4MB RAM Expandable to 128MB
- 200MB SCSI Hard Drive
- EISA SCSI Contoller
- 2S/1P/1G Ports
- 1.2MB & 1.44MB Floppy Drive
- Window Accelerator w/1MB
- 14" SVGA .28 Color Monitor
- 101-Key Enhanced Keyboard
- Enhanced Case w/Power Supply

OPTIONS

• 1.2GB SCSI Hard Drive	Add $650
• 14" Non-Interlaced Monitor	Add $30
• Viewsonic 6E Monitor	Add $80
• Diamond S.S. Pro VLB w/1MB	Add $60
• Orchid Fahrenheit VLB w/1MB	Add $100
• Sound Blaster Pro Deluxe	Add $118
• 250MB Tape Back-up	Add $146
• Mitsumi CD-ROM	Add $174
• CD ROM Upgrade Kit	Add $368

VESA DELUXE SYSTEMS

ORCHID / DIAMOND VLB

486DX-33/256K	$1,738
486DX-50/256K	1,898
486DX2-66/256K	1,938

SYSTEM CONFIGURATION

- Orchid or Diamond VLB M/B
- Orchid or Diamond VLB w/1MB
- VLB IDE Controller w/2S/1P/1G
- 8MB RAM Expandable to 128MB
- 212MB Fast Hard Drive
- 1.2MB Floppy Drive
- 1.44MB Floppy Drive
- 15" Non-Interlaced Monitor
- Northgate Omni 101NI Keyboard
- Medium Tower Case w/PS

OPTIONS

• 170MB Hard Drive	Less $20
• 250MB Hard Drive	Add $30
• 340MB Hard Drive	Add $100
• 540MB Hard Drive	Add $370
• 17" Non-Interlaced Monitor	Add $330
• Sound Blaster Pro Deluxe	Add $118
• 250MB Tape Back-up	Add $146
• Mitsumi CD-ROM	Add $174
• CD ROM Upgrade Kit	Add $368

Why do smart customers keep buying from HI-TECH USA? Simply because we deliver the best values.

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HI-TECH USA — WIDE CHOICES AT LOW PRICES

CASE WITH POWER SUPPLY

Mini Tower Case w/200W Power Supply	$50
Desktop AT Case w/200W Power Supply	52
Medium Tower Case w/230W Power Supply	80
Full Tower Case w/250W Power Supply	108

CD-ROM / MULTIMEDIA

Creative Labs	
MIDI Kit	$42
Sound Blaster	64
Sound Blaster Pro	110
Sound Blaster Pro Deluxe	118
Sound Blaster 16 ASP	196
CD ROM Upgrade Kit	364
Discovery CD 8 Upgrade Kit	378
Discovery CD 16 Upgrade Kit	458
Edutainment CD 8 Upgrade Kit	468
Edutainment CD 16 Upgrade Kit	528
Mitsumi CD-ROM (350MS)	174
NEC CD-ROM 84 / 74 (Int./Ext.)	419 / 559
SONY CD-ROM 31A	194
TEXEL	
DM3024N (SCSI) Internal	358
DM5024 (SCSI) External	448
Trantor SCSI Host w/Driver	78
Audio Pak (Sound Card, Speaker, Joystick, Earphone)	60
Deluxe Speakers	10

CD SOFTWARE TITLES

American Bus Phone Book-1992	22
Animals v1.0 DOS	17
Annabel's Dreams-Egypt	67
Arthur's Teacher Trouble	23
Atlas Pak v3.1 World/US	22
Authorware Star for Windows	48
Barron's College Guide	22
Battle Chess DOS	16
Beyond the Wall of Stars	22
Beauty & Beast MPC	15
Bring the World to Your Senses	14
Campton's Family Encyclopedia	30
Campton's Encyclopedia MPC	54
Carmen San Diego DOS	21
CD Game Pack II DOS	22
CD Storytime DOS	16
Chess master 3000 MPC	17
CIA World Fact Book DOS	17
Composer Quest MPC	30
Desert Storm MPC/MAC	19
Dictionary of the Living World	25
Dinosaur Adventure	23
Family Choice/Britannica DOS	19
Family Doctor DOS/MAC	19
Family Education Collections DOS	19
Great Cities-Vol 1 DOS	19
Great Cities-Vol 2 DOS	19
Guinness Disk of Records MPC	19
Jets & Props MPC	19
Jones in Fast Lane MPC	16
Killer Truck CD-Music Library	18
King's Quest V DOS	16
Kodak Photo CD Access	18
Language of the World	30
Library of Future 1st DOS	45
Loom From Lucas Film DOS	16
Lotus 123 v3.1 MPC	78
Macmillan Dictionary For Children	30
Macromedia Action for Windows	26
Mantis Experimental Fighter	19
Mario is Missing/World Atlas 3.2	18
Mavis Teaches Typing MPC	19
Mayo Clinic Family Health	19
Media Clips - 4 Pk MPC/MAC	38
Microsoft Bookshelf MPC	30
Microsoft Works MPC	30
MIDI Music Shop	19
Mixed-up Mother Goose MPC	19
Monkey Island DOS	19
MPC Audibon's Birds	16
MPC Audibon's Mammals	16
National Geographic Mammals DOS	22
National Park	19
Ocean Digital Imagery VI DOS	22
PC-SIG 11th ED DOS	18
PC SIG 12th Edition	28
Peter & Wolf MPC	15
Playing with Language (English)	24
Playing with Language (French)	24
Playing with Language (German)	24
Playing with Language (Japanese)	24
Playing with Language (Spanish)	24
Presidents DOS	74
Publish It 2.0 DOS	22
Renaissance Masters II	28
Secret Weapons/Luftwf DOS	16
Sherlock Holmes DOS	16
Sleaping Beauty	18
So Much Shareware I DOS	11
So Much Shareware II DOS	15
Sound Library MPC	14
Space Adventure	23
Space Quest IV By Sierra DOS	23
Sport's Best (3 in 1) DOS	18
Stellar 7 DOS	16
Survey of Western Art MPC	24
Tempra Access Photo CD	16
The Right College	25
The Shareware Concept	15
Time Almanac 1991 DOS	18
Time Table of History DOS	16
Tool Works Reference Library	18
Tool Works Encyclopedia MPC	44
Total Baseball DOS/MAC	18
US Atlas v3.1 MPC	16
US Atlas & Automap DOS	24
US History DOS/MAC	23
USA Wars: Civil War DOS/MAC	28
USA Wars: Vietnam DOS/MAC	28
USA Wars: WW II DOS/MAC	28
USA Wars: Korea	28
Whale of Tale	68
Wild Places DOS	12
Willy Bearnish The Adventure	18
Wing Command & Ult VI DOS	22
Wizard PC/MAC	13
World Atlas v3.2 MPC	15
World View DOS	13

CONTROLLERS

IDE 2FD/2HD with 2S/1P/1G	$13
IDE 2FD/2HD Cache Controller	98
IDE with I/O for VESA Local Bus	44
Adaptec	
1542CK w/Kit (SCSI)	234
1542C+ w/ASW 500 (SCSI)	308
1742A EISA (SCSI)	384
BusLogic 742A EISA (SCSI)	270
BusLogic 445S VLB (SCSI)	270
DTC EISA IDE	128
DTC EISA SCSI	448
Mylex EISA (SCSI) w/4MB Cache	718

HARD DRIVES

40MB 25MS IDE	$99
80MB 19MS IDE	146
120MB 19MS IDE	156
130MB 15MS IDE	166
170MB 17MS IDE	176
212MB 15MS IDE	198
250MB 15MS IDE	228
340MB 12MS IDE	294
540MB 12MS IDE	568
212MB 15MS SCSI	278
340MB 13MS SCSI	398
520MB 12MS SCSI	648
1.2GB 13MS SCSI	918
1.7GB 13MS SCSI	1,148

KEYBOARDS

Focus	
FK2001 101-Key Click	$36
FK9000 Programmable w/Calculator.	60
Keytronics 101-Key Enhanced	30
Mitsumi 101-Key Enhanced	17
Maxiswitch 101-Key Enhanced	28
Northgate	
OMNI 101 NI	64
OMNI 102	64
OMNI Ultra T or F	84

MATH COPROCESSORS

387DX-40	$63
387DX-33	60
387SX-33	58
387SX-25	56

MODEMS & FAXES

2400 Modem (w/9600 Send Fax)	$26
Fax Modem (9600 Fax/2400 Modem)	43
Fax Modem (14,400 Fax/14,400Mdm)	134
Pocket Fax Modem (14,400/14,400)	208
Hayes	
Accura 14400 Fax Modem Int	234
Accura 14400 Fax Modem Ext	254
Optima 14400 Fax Modem	384
US Robotics	
Sportster 9600 Modem Int	148
Sportster 14400 Modem Int	168
Sportster 14400 Modem Ext	184
Sportster 14400 Fax Modem Int	174
Sportster 14400 Fax Modem Ext	186

MONITORS

14" Mono Amber	$82
14" VGA Mono	108
14" VGA (640•480) .51	174
14" Super VGA 1024•768 .39	194
14" Super VGA 1024•768 .28 Int	228
14" Super VGA 1024•768 .28 NI	252
15" Super VGA 1280•768 .28 NI	358
17" Super VGA 1280•768 .26 NI	678
ADI	
4G 15" 1280•1024 .28	428
CTX	
14" Super VGA 1024•768 .28 Int	254
14" Super VGA 1024•768 .28 NI	278
CPS1561 15" 1024•768 .28 NI	378
CPS1560LR 15" 1024•768 .28 NI	408
CPS1760 17" 1280•1024 .28 NI	728
CPS1760LR 17" 1280•1024 MPR II	798
Hitachi	
CM1584MV 15" 1280•1024 .28 NI	508
CM1785MV 17" 1280•1024 .28 NI	918
CM2095 20" 1280•1024 .28 NI	1,284
CM2187M 21" 1600•1280 Microp	2,088
MAG	
MX15F 15" 1280•1024 .28 NI	498
MX17F 17" 1280•1024 .26 NI	938
NANAO	
F340IW 15" 1024•768 .28 72Hz	658
F550I 17" 1280•1024 .28 NI	1,010
F550IW 17" 1280•1024 .28 75Hz	1,078
T560I 17" 1280•1024 .26 TRIN	1,644
T660I 20" 1280•1024 .31 72Hz	2,418
F750I 21" 1280•1024 .31 NI	2,048
NEC	
3FGe 15" 1024•768 .28 NI	578
4FGe 15" 1024•768 .28 NI	678
5FGe 17" 1024•768 .28 NI	1,078
6FG 21" 1280•1024 .28 NI	2,298
SONY	
1304S 14" 1024•768 .25NI	518
1430 14" 1024•768 .25 NI	564
1604S 17" 1024•768 .25 NI	894
1730 17" 1024•768 .25 NI	968
VIEWSONIC	
4E 14" 1024•768 .28 Int	269
5E 14" 1024•768 .28 NI	356
5+ 14" 1024•768 .28 NI	458
6E 14" 1024•768 .28 NI	296
7 17" 1280•1024 .28 NI	878
15 15" 1280•1024 .28 NI	518
17 17" 1280•1024 .28 NI	1,058
20 20" 1600•1280 .28 NI	1,698

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Trackman	71
Scanman 256	248
Microsoft Mouse	42

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P-NS2000-TA 10 Base-T & AUI	98
P-NS2000-3 10 Base-T & 2 & AUI	128
P-ENET-3200 (EISA)	268
ARCnet	
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8-Port Active Hub	118
Bus Topology 8 BIT ISA Card	48
Bus Topology 16 BIT ISA Card	58
Star Topology 8 BIT ISA Card	48
Star Topology 16 BIT ISA Card	58
BootROM	
8 BIT or 16 BIT Auto Boot PROM	15
Hubs and Repeaters	
4-Port 10 Base T HUB	148
6-Port 10 Base T HUB	208
12-Port 10 Base T HUB	438
Daughter Card, 4 Additional RJ45 Ports	68
Daughter Card, BNC+AUI Ports	58
2 BNC Ethernet Repeater	198

PRINTERS

Citizen	
GSX-190 (9-Pin)	$158
GSX-230 / GSX-240 (24-Pin) Quiet	248 / 298
GSX-145 (24-Pin) Wide	378
Color Option for Citizen Printers	48/68
Panasonic	
KX-P1123 (24-Pin)	169
KX-P1124I (24-Pin)	239
KX-P1624 (24-Pin) Wide	348
KX-P2180 (9-Pin)	158
KX-P2023 (24-Pin) Quiet	198
KX-P2123 (24-Pin) Color Capacity	219
KX-P2124 (24-Pin) Color Capacity	318
KX-P2624 (24-Pin) Quiet Wide	378
Color Upgrade Kit KX-PCK11	48

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DJ-20 Tape Back-up 250MB	178
KE-9 Ext. Kit for DJ-10/Dj-20	68
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JT-10 Trakker 120MB Ext	288
JT-20 Trakker 250MB Ext	368
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Cirrus Logic VLB w/1MB	92
ATI	
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Graphics Ultra Plus 2MB	248
Graphics Ultra Pro 2MB (ISA)	318
Graphics Ultra Pro 2MB (VLB)	328
Graphics Ultra Pro 2MB (EISA)	368
Diamond	
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Stealth Pro VLB 1MB (VRAM)	268
Stealth Pro VLB 2MB (VRAM)	318
Viper VLB 2MB	380
Genoa	
8500 VLB 1MB	108
Number Nine (#9)	
Level 10 (ISA)	298
Level 11 (ISA / VLB)	364
Level 12 (ISA / VLB)	434
Orchid	
Fahrenheit 1280 Plus 1MB (S3-801)	138
Fahrenheit VLB 1MB (S3-805)	146
Fahrenheit VA 1MB (S3-801)	140
Fahrenheit VA VLB 1MB (S3-805)	188
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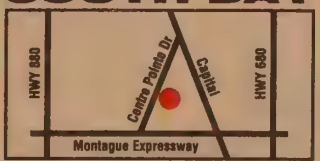

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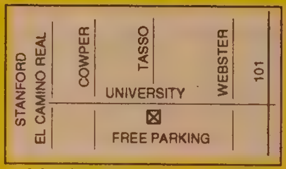

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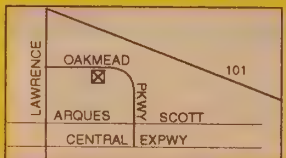

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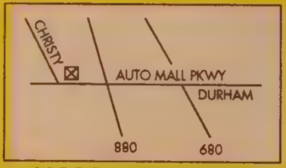

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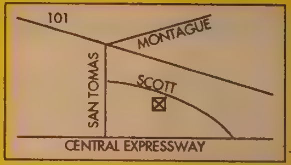

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USER GROUP NETWORK

BULLETIN BOARDS

RESOURCE LISTING CHANGES

As electronic bulletin boards continue growing, system operators are adding phone lines that include additional area codes. Beginning with issue #100, *MicroTimes* introduced a "Multi-Zone" category for BBSes with access phone numbers in multiple area codes.

Thank you,
MicroTimes staff

MULTI-ZONE

Adventures Online. (408)985-1529, 732-4908; (415)321-3661, 365-7002, 573-1063, 244-9218; (510)797-4101. 24 hrs., Multi-user, interactive D&D style fantasy adventure game (similar to MUDD), chat on twelve lines. [Exp. #112.]

Dating Tree BBS. (408)946-1431; (415)349-0961; (510)430-8675. 16 lines, online chat, email, matchmaking. Call for more access numbers. [Exp. #112.]

First Online. (408)247-1717; (415)598-0398, 992-3780; (510)254-5455, 862-2200. Over 30,000 files, 4.2GB, PC-SIG library, adult files. PC and compatibles. [Exp. #113.]

HoloNet Internet Access BBS. (510)704-1058; call for other nationwide numbers. 8-N-1, 24 hrs., 1200/2400/9600/14,400. Internet: telnet, FTP, IRC, MUDs. 3500+ Usenet groups. Free demo. [Exp. #111.]

Interactions BBS. (408)258-8913, (415)469-5510, (510)832-0560. 12-line chat (over 18 only), email, shareware library, two-week free trial. Sysop: C. Watson. [Exp. #113.]

Lambda. (415)572-2591, 755-9439; (510)268-9891. Adult, mostly gay/lesbian, all are welcome, email, chat, matching. Free. [Exp. #112.]

Paul Revere Network. (408)947-7800, 281-0725; (510)803-0319. Nationwide 50+ node BBS network of grassroots firearms rights activists. PRNKIT.ZIP file for full node list. [Exp. #113.]

Portal Communications. (408)725-0561, (300–2400); (408)973-8091, (9600–57,600); (415)965-8059, (300–57,600). Worldwide X.25 online, shell, BBS & UUCP connections. Voice: (408)973-9111. [Exp. #111.]

Pro-Line BBS. (408)226-3880; (510)888-1130. 24 hrs., Chat, matchmaking, database lifestyles, email, and more. [Exp. #112.]

SF Net. (415)824-8747, 589-2194, 332-3923; (510)450-0155, 638-8644. Coffee House/Cafe Connection, 32 lines, public terminals, chat, matchmaker, msg areas, Fido 1:125/824, Internet mail. Voice: (415)695-9824. [Exp. #111.]

408

#1 Fun Seekers. (408)379-0958, 379-9680. 8-N-1, 24 hrs., IBM, lots of adult/other files, online games, classified ads, msg base. [Exp. #113.]

A32 Macintosh User Group BBS. (408)378-8252. 24 hrs., 2400. Mac, First Class, members only. [Exp. #112.]

Adventure Sports BBS. (408)241-7776. Discounts, info, and discussions on Adventure sports like paintball, bungee jumping, hang gliding, and more. Free, immediate access. [Exp. #113.]

Amateur Action BBS. (408)263-3393. 14,400. Adult Amateur GIF files, sixteen lines. [Exp. #113.]

Applied Knowledge BBS. (408)733-9341. 8-N-1, 14,400. Free stock price forecasts on 6000 NYSE, AMEX, and OTC stocks. Free access. [Exp. #111.]

Autos Online. (408)356-3866, 358-2010. 1200/2400. Shop Bay Area new car dealer inventories, private party for sale and wanted. Join vehicle related forums. No fee. [Exp. #113.]

Bay Area Atari User Group BBS. (408)986-0215. 8-N-1, 24 hrs., 300/1200/2400. [Exp. #111.]

BayNar-Net. (408)926-8547. 24 hrs., 2400. Model rocketry, astronomy, IBM programs, family-oriented, NAR affiliated. Sysop: Phil Hayton. [Exp. #112.]

Burn This Flag. (408)363-9766. 2400/9600. Esoteric text files and message system from closet Luddites. San Jose, two lines. NIRVANAnet. [Exp. #111.]

Code Room. (408)266-3818. 8-N-1, 16,800. A Programmer's BBS: complete support for OS/2 2.x, tons of C files, Fido and FxNET msg networks, and Fun Doors. Sysop: Ramin Akhbari. [Exp. #111.]

Comp-U-Ease. (408)286-8332. Engineering and CAD, related files and topics, hum for RIME email network. [Exp. #111.]

Cruzio. (408)423-9995. 8-N-1, 1200/2400/9600/19,200. Santa Cruz, email, USENET newsgroups, calendar, agency & gov't. directory listings. Sysop: Chris Neklason & Peggy Dolgenos. [Exp. #112.]

The Dark Side Of The Moon. (408)684-2623. 24 hrs., 2400. Online games. Sysop: Riverwind. [Exp. #113.]

Data Port BBS. (408)259-3019. 8-N-1, 24 hrs., 14,400. Internet email. OS/2 support, FidoNet, OS2net, RBBSnet. No fees. Sysop: Ian Robertson. [Exp. #113.]

Dr. Image BBS. (408)453-6250, 453-6254. 1200/2400.

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BAY AREA BBSes

By Kathleen Creighton

NEW ONES COMING AS THE OLD ONES GO

When Doris told the story about having her daughter's bedroom taken to the dump, I laughed so hard I thought I'd start crying. Helen's story about the horse novena, Alan's about suffering existential angst as a young adult in a third-floor walkup one sweltering summer in Washington, DC, and Jacci's stories about her three babies in diapers have been just some of many delightful notes posted in a group I frequent online. Although our special interest group is serious business, I know every day that I'm going to have a good time there.

I've been thinking about our group, and all of the other groups online just like it, quite a bit lately since we happen to be meeting on Prodigy, and come price increases on July 1, many members of my group are going to bail out. (The bulletin board areas will change from being included in Prodigy's flat fee, to $3.60–$4.80 an hour access time, depending on level of use.) I'm concerned that the ones who vow to stay simply have no experience with how easy it is to rack up large telecomm bills, so I expect attrition over the next several months as users suffering sticker shock become more realistic.

It's easy for people steeped in telecomm to just open an account elsewhere, but Prodigy appeals to a large number of telecomm novices. Some have gone to other services and have enjoyed the challenge of learning something new. Others are afraid to try. Whatever happens, our little group isn't going to be the same.

When *MicroTimes* writer David Hawkins was sysadmin of the WELL, he used to joke that one of the permanent topics on the WELL should be "The End of the WELL as We Know It." It's a commentary on how much we dislike change and disruption, and are suspicious of anything "new" in our territory. But in some ways changes online really are more difficult inasmuch as we, as users, develop some deep relationships with people we don't know and will likely never meet, but we don't have much control over the meeting place. Any day we could dial in and find that all the rules have changed, the sysop has closed up shop, the online service has raised its rates.

Two women in my group, acknowledged telecomm "illiterates," now have Internet addresses, and a couple of others have expressed interest. Some are being introduced to Procomm and text-based online services for the first time. One has been exploring the free BBSes in her geographic area and has participated in a local BBS get-together. She has also volunteered to be the advance person to test out National Videotex Network's new offline reader so she can help the rest of us who've gathered on NVN.

We're splitting up. Some of us will stay in touch, but the adventurous will also go out on their own to explore new frontiers.

There is another group on Prodigy which is grief-stricken, whose members feel they can't possibly be apart. Reading their postings is like a travelogue through the five stages of grief, except that most of these people have not yet reached "acceptance." It's easy for the telecomm

Continued

BBSes continued...

Windows, DOS, GIFs, fonts, music, and more. Free. Sysop: Eric Ho. [Exp. #113.]

The Electric Pages. (408)253-4280. 300/1200/2400. Commercial and private advertising. Select by category or key words. Voice: (408)253-1709. Sysop: Contemporary Communications, Inc. [Exp. #111.]

Escape To Other Worlds BBS. (408)956-1750. 8-N-1, 1200/2400/9600/14,400. SF/fantasy, comics, games, RIME. Three lines, D/L files. Mac and PC GIFs, 1.8GB. [Exp. #111.]

Higher Powered BBS. (408)737-7040. 2400–16,800. Multiline, voted in Top 100 BBSes in World. Over 300 ILink, SmartNet, Intelec, SFNet conferences. [Exp. #111.]

The LaserBoard. (408)268-4863, 268-6323. 24 hrs., 14,400. RIME, local TNET, and Wildnet conferences. Call and download the latest file available and best service around. Free. Sysop: Shawn Higgin. [Exp. #113.]

Laser Light BBS. (408)496-0771. 8-N-1, 24 hrs., 2400/9600/14,400. IBM, best games in town! Apogee, EPIC, Moraff & MVP Release site. Sysop: Robert Mueller [Exp. #112.]

Mail Stop BBS. (408)257-1919. 8-N-1, 24 hrs., 300/1200/2400/4800/9600. Free, private email and SIG system. Internet mailboxes avail. Sysop: Dcarter. [Exp. #111.]

The Meating Place BBS. (408)926-6174. 24 hrs., 14,400. Gay/Bi, six lines, email, chat, matchmaker, GIFs, and more. System password: Micro. [Exp. #113.]

Mongoose BBS. (408)733-3034. 1200/2400/9600/14,400. SmartNet, adult files, latest shareware files. Free access. Sysop: Robert Yagmourian. [Exp. #112.]

Monterey Gaming System. (408)655-5555. 300/1200/2400/9600/14,400. 24 lines, conferences, msgs., custom games. Free. [Exp. #113.]

Moon Base Hq. BBS. (408)248-3655. 24 hrs., 14,400. 2 CD-ROMs, doors, files, adult & non-adult msg base. Sysop: Reed Slockett. [Exp. #113.]

Moose Is Loose BBS. (408)773-9573. A fun place to message other adults. Sysop: John Giever. [Exp. #112.]

The Mud Hole BBS. (408)865-1621. Two lines, msg door games. No files! [Exp. #113.]

Nasty Playmates. (408)374-2627. Adult social dating, all preferences, matchmaker, personal ads. Attach GIFs/files to mail. [Exp. #112.]

Nitelog BBS. (408)655-1096, 655-8294. 24 hrs., 300–16,800. DOS/Windows/OS2 adult files, 20 lines, 6.3GB. Sysop: Karl Van Lear. [Exp. #112.]

Paradise City BBS. (408)280-6630. 1200/2400/9600/14,400. two lines. Tons of files and doors. Free full access on first call. Sysop: Jim Reed. [Exp. #111.]

PC-SIG BBS. (408)524-9835. 8-N-1, 24 hrs., 2400/9600/14,400. PC-SIG entire software library plus all new programs reviewed on Shareware Magazine. [Exp. #112.]

Personal Quest/Gaming BBS. (408)253-1367. 24 hrs., 1200/2400. Sports, gaming, handicapping conference. Womens World conference, HIV+ only conference. [Exp. #111.]

PIM Data Line! (408)448-3060. 8-N-1, 14,400. Win games, fonts, utils. MicroPatent support. All free. Sysop: Wayne C. Brown. [Exp. #112.]

Praise Chapel Of Santa Clara ANSI-BBS. (408)747-0192. 8-N-1, 2400. Christian topics, files, and discussions. Running TAG. [Exp. #113.]

Ring Of Fire BBS. (408)739-8753. Home for United Sysop's Association and Silicon Valley Novell Users Group. Since 1982. Hub for USAnet. Sysop: Bill Strouse. [Exp. #111.]

The Rising Storm. (408)739-8693. 8-N-1, 14,400. Emergency prep., firearms, politics, and more. Survival echos and files. Sysop: Kirk DeHaan. [Exp. #111.]

Risque Business. (408)776-1841. 16,800. Premium adult graphics. [Exp. #113.]

The Roadkill Grill. (408)985-0213. 1200/2400. Fidonet/OtherNets. 5 nodes, lots of loony people. Free access. Sysop: Bryce Wolfson. [Exp. #111.]

San Jose Connection. (408)956-8819. 8-N-1, 24 hrs., 300/1200/2400/9600. Fidonet 1:143/111. KinkNet 69:1000/111. Many msg areas, files, job listings, all orientations, adult, and teens. Free. Sysop: Eral & Manuel. [Exp. #111.]

The Shrine BBS. (408)747-0778. 9600. Magick, religions, sex, and more. Adult and women only areas by request. Free system. Sysops: Junell Zzz and Tom Zoch. [Exp. #111.]

ShrinkTank BBS. (408)257-8131. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Mental Health, Psychology, Men's Issues, Recovery conferences. All users welcome! Sysop: Rob Bischoff, Ph.D. [Exp. #111.]

The Silicon Connection. (408)492-9700. 24 hrs., 300/1200/2400. Electronic PenPal Network, 20 lines. [Exp. #111.]

The Silicon Valley Christian Connection. (408)246-7002. 300/1200/2400/9600/14,400. NewLife Net, Christ World Echo Mail, files, MIDI, GIFs of the Holy Land. Free access. [Exp. #112.]

Smorgasbord BBS. (408)722-9101. Aptos, Watsonville, Gilroy. 25,000 IBM/Mac files, matchmaking, WNET. [Exp. #111.]

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BBSes

Games, utils, multimedia, GIFs, Win 3.xx, sound, and more. Sysop: Tony Luu. [Exp. #111.]

The Support Network BBS. (408)259-0297. 10:00 am–midnight daily, 8-N-1, 1200/2400/9600. Community computing for Santa Clara County. Sysop: Frank Arnold. [Exp. #111.]

Syner Chat STS-14. (408)929-1980. 24 hrs., 300/1200/2400. twelve lines, teleconferencing, nationwide linking. Free two week trial membership. Sysop: Joe Boo. [Exp. #112.]

The Tech BBS. (408)279-7199. 8-N-1, 5:30 pm–9:30 am, PST. 300–19,200. BBS run by staff and volunteers of The Tech Museum of Innovation. [Exp. #111.]

Thunder Mountain BBS. (408)266-4553. 8-N-1, 300/1200/2400. five lines, chat, email, matchmaker, files for all. Free. Sysop: David Alvarado. [Exp. #112.]

The Virtual Reality BBS. (408)246-5434. 8-N-1, 9600. Msgs, files, CD-ROM. Free. Sysop: Jim Busby. [Exp. #113.]

The Warrior Realm BBS. (408)287-3945, 287-0835. 8-N-1, 24 hrs., 300/1200/2400. Multiplayer doorgames & FRP, IBM files, and fun. Sysop: Mark Barrow. [Exp. #111.]

415

ABACUS BBS. (415)587-8062. 8-N-1, 24 hrs., 300/1200/2400. Supporting Atari 8-bit, ST/STE/TT030/Falcon030 computers. Msg bases and files avail. Free. [Exp. #113.]

AHA Hydrogen BBS. (415)494-3116. 8-N-1, 1200/2400/9600/14,400. Alt. energy info—prosperity without pollution. [Exp. #113.]

Airtight Garage. (415)641-0348. FidoNet msg. areas, SIGs in science fiction, motorcycling, etc. Free. Sysop: Carlos Benitz. [Exp. #112.]

Amiga Station San Francisco BBS. (415)824-8774. 24 hrs., 300/1200/2400. TBBS supporting the Commodore Amiga. Free reg. Sysop: Richard Gaikowski. [Exp. #112.]

Anatomically Correct BBS. (415)856-8425. 24 hrs., 2400. Discussions of adult issues, more than 100 stories. No GIF files. Sysop: Howeird. [Exp. #111.]

The Back Door. (415)756-6238. 24 hrs., 300/1200/2400/9600/14,400. 49 lines, separate Gay, Lesbian, and Straight sub-systems. 18 and over only. [Exp. #111.]

The Board With No Name North. (415)826-9626. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Gay male BBS, chat, ONMIChat, email, library w/ GIFs & fantasy text. [Exp. #112.]

California Online! (415)331-4081. 9 lines, "California ChatLine", file/msg database, Internet, games. Free & reg access. Sysop: Jim. [Exp. #112.]

Charisma II. (415)802-9011. 1200–14,400. two lines, tons of files and conferences. Free reg 1st call. Sysop: Robert Maverik. [Exp. #111.]

The Classified BBS. (415)665-7918, 665-2475. 8-N-1, 24 hrs., 14,400. For-sale, echo mail, files, and more. FidoNet, Internet, USENET, TCalnet, Kinknet. [Exp. #113.]

Compool BBS. (415)948-8928. 1200/2400/9600. IBM/MS-DOS file exchange, three lines, 2500+ files. Sysop: Andy Bajka. [Exp. #111.]

Computer Show Hotline. (415)340-9370. 8-N-1, 1200/2400. Latest Computer Show info. Complete list of dates, times, locations, and directions. [Exp. #111.]

Contractors Exchange BBS. (415)334-7393. 8-N-1, 24 hrs., 2400. Jobs, leads, software for the contractor. Sysop: George Salet. [Exp. #112.]

Corner UNIX. (415)564-8750. 8-N-1, 1200/2400/9600/14,400. San Francisco Public Access UNIX. Full USENET/Internet email. Sysop: Furryeel. [Exp. #112.]

CPP MultiMedia BBS. (415)665-1546. 24 hrs., 300/1200/2400/9600/14,400. Multimedia, GIFs, sound, Windows, credit help, pets. Sysop: Mike Clements. [Exp. #113.]

The Cutting Edge BBS. (415)751-0588. 2400–16,800. 7+GB, 12 CD-ROMs, 70,000 files, online VGA multiplayer games.. Sysop: Evan Margolin. [Exp. #112.]

The Elfspire Tome BBS. (415)595-2387. 1200/2400/9600. A Fantasy roleplaying G.M. resource bulletin board featuring roleplaying, games, fantasy clipart, and more. [Exp. #112.]

Fun University Network (FUN). (415)327-4591. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Current events, simulation games, and puzzles. Sub w/ free intro. Sysop: Wendie, Mike, Lisa, and Scott. [Exp. #111.]

Golden Gate Computer Society BBS. (415)927-1216. 24 hrs., 1200/2400/9600/14,400. Four lines, ILink, CalLink, and USENET. d/l OK on first call. [Exp. #113.]

Guideboard. (415)864-3858. 24 hrs., 300/1200/2400. Multiline, Cabbie's Guide to SF restaurants, doctors, auto repair, etc. Sysop: Dick Schwartz. [Exp. #113.]

The Hare's Nest. (415)883-4968. 8-N-1, 2400. Gentlemanly pursuits—flyfishing, golf, billiards. River info, USGA handicaps, and more. [Exp. #111.]

Hispanic OnLine Access. (415)252-0285. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Hispanic issues, software, business. Free. [Exp. #112.]

IBBS West. (415)564-9996. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. 4 lines, PC and compatibles, shareware, utils., adult GIFs, CD-ROM, 13,000 files. Fee. [Exp. #113.]

InfoDude Communications. (415)855-9500. 24 hrs., 2400/6900/14,400. Teleconferencing, Forums. IBM, Windows, Mac, and Amiga files. Private email. Instant reg., first 30 hrs free, $3/mo. Sysop: Joseph A. Jenkins. [Exp. #111.]

The Informer BBS. (415)468-6713, 468-9913. 24 hrs., 2400–14,440. TCalNet, Intelec, FamNet, WindNet, Newlife, Operating Systems, Tech Specs, conferences. Subscription/free. Sysop: John Custer. [Exp. #111.]

International House Of Leeches. (415)897-8190. 300/1200/2400. Online games, 4GB of CD-ROMs, adult sections. Running T.A.G. Sysop: Vincent. [Exp. #111.]

Lies Unlimited. (415)583-4102. 2400. Politics and polemics. NIRVANAnet. Instant access, no fee. [Exp. #111.]

Marin County Net. (415)331-6241. 24 hrs., 2400–16,800. Aviation, sailing, files, and conferences. two nodes. Free. [Exp. #111.]

The MIDI & Multimedia Exchange BBS. (415)771-1788. .MOD, .MID, .VOC, .SAM, .AVI, .FLI & Synth Patch's. Sysop: Walter Perko. [Exp. #112.]

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NiteLite Remote BBS. (415)965-8365 (Public Callers); 965-4097 (Members Only). 8-N-1, Internet email, FidoNet 1:143/214, doors, networked games. Sysop: Byron McKay. [Exp. #112.]

Pacific Micro BBS. (415)941-9699. 14,400. Free. [Exp. #113.]

Recovery BBS. (415)255-2188. 8-N-1, 300/1200/2400/9600/14,400. Dedicated to 12 Step Recovery programs (AA, NA, Al-Anon, CoDA, SLAA, etc.). Fido 125/9. Sysop: Rich Gorlin. [Exp. #111.]

Robotic BBS. (415)648-6427. 8-N-1. Software and msgs. for robot building enthusiasts. Sysop: Brad Smallridge. [Exp. #113.]

Salt And Light BBS. (415)368-0790, 252525. 8-N-1, 2400. Bible/God question and answer resource. Questions answered by four ordained ministers. Bible-related study helps, games, and files. Free. Sysop: Lorin Wilson. [Exp. #111.]

San Francisco PC Users Group BBS. (415)621-2609. 8-N-1, 24 hrs., 1200/2400/9600/14,400. Sysop: Richard Couture. [Exp. #111.]

The Shareware Exchange! BBS. (415)992-2860. 8-N-1, 1200/2400/9600/14,400. Latest shareware IBM files, distribution site. Online games, msgs, and more. Sysop: Christopher Jong. [Exp. #113.]

SMUG (Stanford-Palo Alto Mac User Group) BBS. (415)856-0210. BBS on Threshold 2000, uses Telefinder GUI. [Exp. #111.]

Symmetrics BBS. (415)382-6679. 8-N-1, 24 hrs., 1200/2400/9600/14,400. Online games and lots of shareware programs. [Exp. #113.]

The System. (415)365-1246. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Accounting, AccPac, BPI, Simply, Telemagic, Novell. Email, 600MB file area, and virus free. [Exp. #113.]

Uncle D's Directory. (415)364-3001. 8-N-1, 24 hrs., 1200/2400/9600/38,400. Software for deaf & education, msgs, file search, classified ads, offline mail, doorways. No fees. [Exp. #113.]

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VidGame BBS. (415)742-6441. 2400–16,800. 5500 GIFs, music files, online games, Windows, LAN, utils, computer news, 2.2GB. Sysop: George Hassmer. [Exp. #112.]

Walking Thru Syrup. (415)666-3249, 752-3614. A message based board with subs about homebrewing, coffee, and everything else. [Exp. #112.]

Wetware Diversions Public UNIX. (415)826-0397. 8-N-1, 24 hrs., 1200/2400. Full Usenet news, eight lines. Sysop: Eric Swason (editor@wet.UUCP). [Exp. #113.]

Window World BBS. (415)931-0649. 24 hrs. For people who use Windows-type software. Info., shareware, chat. Sysop: Bob Cram. [Exp. #113.]

510

& the Temple of the Screaming Electron. (510)935-5845. A safe haven for visionaries and paranoids. 242MB of unusual text. NIRVANAnet HQ. Multiuser chat lines: two free, two contributor, two local. Sysop: Jeff Hunter. [Exp. #111.]

8-Bit Apple User Group. (510)294-8052. 24 hrs., 300/1200/2400. Apple II support, email, msgs, games, files. Free. Sysop: Noel Anklam. [Exp. #113.]

AbysS BBS. (510)482-5813. 24 hrs., FidoNet, GaSpNet, games, files, email, BRE League, Telegard Beta Site. Sysop: Gary Stewart. [Exp. #111.]

Activist. (510)532-6248. 1200/2400/9600/14,400. Files/msgs on politics, conspircy, technol, privcy, histry, philosphy, ethics, arts. Sysop: Walter Alter. [Exp. #111.]

A Good Investment. (510)417-0444. 1200/2400/9600. Investment-related files and message areas. Free, full access 1st call, ample download time. Sysop: Mark J. Welch. [Exp. #111.]

Alpha Centauri BBS. (510)947-5835. 24 hrs. Fantasy, msgs, games, downloads, frisbie, etc. [Exp. #113.]

Amiga Addicts Anonymous BBS. (510)680-2850. 8-N-1, 24 hrs., 1200/2400/9600. Amiga files. Free. Sysop: Stanley R. [Exp. #112.]

Berkeley WWIV Chess BBS. (510)486-0795. 8-N-1, 2400. Chessmaster's corner, Fido International Chess Echo, USENET rec. games.chess. Sysop: Walter Wood. [Exp. #111.]

Beyond Your Wildest Fantasy BBS. (510)785-4312. 24 hrs., 1200/2400. Lrg online fame, file, and msg sections. [Exp. #113.]

Blue Smoke CD-ROM BBS. (510)455-5587. 24 hrs., 14,400. Access 15,000 files, FidoNet, RANet, email. No ratio, free. [Exp. #112.]

Breaking Walls; Building Bridges BBS. (510)827-0804. 24 hrs., 300/1200/2400. HIV, LesBiGay, MCC, FidoNet, and HIV-Net. Sysop: Deacon DVMCC. [Exp. #112.]

Bust Out BBS. (510)888-1443. 24 hrs., 14,400. 9 nodes, 5GB, huge msg and file network including the Internet (many adult). Computer systems and software services. Sysop: Alex J. Riggs. [Exp. #113.]

Callisto Tower BBS. (510)794-9788. 24 hrs., MAGNet, GaSpNet, DangerNet echos. Files and reg doors. No fees. [Exp. #111.]

Camphor Fountain BBS. (510)547-5741. 8-N-1. Baha'i Network, nine FTS networks. Instant access, no fee. Sysop: Linda Martin. [Exp. #113.]

ComAir Express BBS. (510)837-3910. 1200/2400. Flight Simulator and general files, active msg bases. CheapNet and VirtualNET. Sysop: Havok. [Exp. #111.]

Compu-Ace RBBS. (510)794-4029. 9600. FidoNet 1:215/739, BAY_LINK member. Files, games, msgs, and more. Sysop: Scott A. Mercer. [Exp. #113.]

Compufacts. (510)649-1933. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Device drivers, jumper settings. The facts you need to know. Free & subscription. [Exp. #111.]

The Creative Dimensions BBS. (510)484-4944. 24 hrs., 1200/2400. Home of CD-MAN and more. Free downloads on first call. [Exp. #112.]

The Diamond Mind. (510)791-1910. 8-N-1, 24 hrs., 300/1200/2400/9600,14,400. Emotional support, IBM and Mac files, Fido echos, chat, online games, adult areas. Free user level. Sysop: Diamond & Frank. [Exp. #111.]

The Dragonhead BBS. (510)417-8718. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Online games, offline mail reader. Free. Sysop: Ray Khechen. [Exp. #113.]

Ecclesia BBS. (510)526-6584. 24 hrs., 1200. FC board, GUI for Mac and Windows. Homeschool Online Network. Kids welcome. Free. Sysop: Jason Rippetoe. [Exp. #113.]

FrEdMail Oakland. (510)834-2636. 1200/2400/9600. Educator/student network w/ Internet mail access, OUSD Bilingual Ed support BBS. [Exp. #111.]

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GMV-BBS. (510)294-9052. 24 hrs., 300/1200/2400/9600. Multiline subscription BBS. Teleconference, private chat, email, SIGs, games, and file library for Amiga, IBM, Apple 8-bit, and Mac. Livermore. [Exp. #111.]

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The Hobby Shop BBS. (510)357-4125. 8-N-1, 38,400. Over 5600 files, many adult, Fido. No upload ratio, free. [Exp. #113.]

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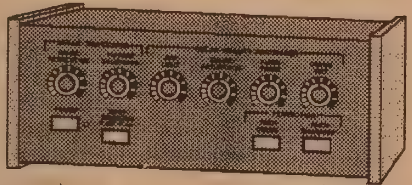
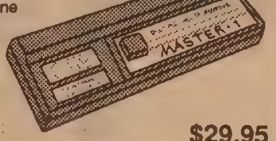


Chernobyl Fallout?

What else could it be when the Russians gear up to build many thousands of these personal radiation dosimeters? They were obviously meant for mass-consumption, as they are blister-packed on a hanger card! It is also telling that some of the packs have instructions in Finnish and Swedish! These pocket-sized (5" x 1.75" x .75") units are frankly not as high in build quality as the Soviet microscopes we were selling a year ago, but they do seem to count gamma radiation exposure from .01 to 9.99 micro-Siewerts per hour (One micro-Siewert = 100 micro-Roentgens). According to the instructions, the maximum admissable safe radiation level is .1 to .6 μSv/h. The instrument uses four commonly available button cells (Russian ones included) that are supposedly good for about 2 years of use four times a day. We opened one of the units up and were interested to find Russian IC's inside...Hmm, do they have a Silicon Valley in Russia?



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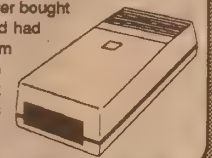
Here is the answer to your expensive disk drive enclosure blues...a large manufacturer bought these units to remove the drives and had leftover cases. What to do? Sell them to you! Plastic case and bracket with beefy linear power supply will work with any half-height 5.25" drive (needs drive power connector, cable exit hole).



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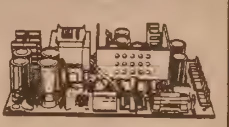
These tiny (3" x 5" x 1.5") switching power supplies by Protek are small in size only! They are big on performance and value, and are perfect for use with 3.5" or smaller hard disk drives. 110 or 220VAC input, 5VDC @ 3A, 12VDC @ 2A, -12VDC @ .3A output. Similar to illustration.



HSC #13728 **$14.95 ea.** ***Special!***

Stash of MFM Contollers found... Hurry before they Vanish!

That's right...these 16-bit (AT bus) MFM Hard Disk controllers represent the last of a vanishing breed! No one is making MFM controllers anymore, so if you have a MFM drive or two and don't have a controller, you definitely need one of these. Everex EV-349 supports two floppies and 1:1 interleave for up to two MFM hard drives. LED output for connecting to your drive activity light. Latest surface-mount technology means rugged reliability and low power consumption. Brand new in antistatic bag, cables not included. Sorry, no docs yet. There are plenty of MFM Drives out there on the secondary market, but controllers are another matter...hurry!

HSC#14043 One year warranty! **$39.95**

Let HSC be your SCSI Hardware Headquarters!

All drive enclosures feature fan-cooled power supplies, SCSI address switches and ICN50 connector knockouts. Styles A&B include ribbon cable, the others do not. Inquire about our selection of SCSI cables when ordering.

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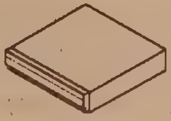
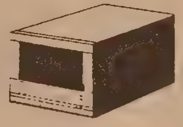
B.	SKHD1/Open	55W P.S.,	Same as above, but with 5.25" front opening	10" x 10" x 2.25"	$99.95
C.	SLHD2	60W P.S.,	Front opening for two half-height drives.	7.5" x 12" x 6.5"	$119.95
D.	SLHD3	60W P.S.,	Front openings for three half height drives	7.5" x 12 x 9"	$139.95



Style "A", "B"



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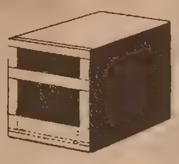

Style "D"

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This is the type of deal we love to offer our customers, because it has so much potential. We bought these items for the neat case, but then discovered that the unit inside has a wealth of possibilities. We offer some suggestions, let your imaginations run wild!

Option #1 -- Weathertight Equipment Case will accept a 19" standard rackmount unit up to 5" high (with standard 5.25" front panel) and 11" deep. Gasketed front cover has cable storage clips, case has storage slot for .5" thick manual above unit. Outside dimensions are 20" x 7" x 15" deep, exclusive of rubber feet, four sturdy latches and spring-loaded carry handle. Weight 11 lbs. Constructed of aluminum, Navy grey color. Perfect for ham gear (field day!), instrumentation, or other projects requiring rugged, weathertight Mil-spec. case.

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Option #2 -- Frequency Converter Unit (removed from case above) Mod. CV-2353/U was used to mix external signals from 100 Hz to 2 MHz with an external oscillator signal for output to a spectrum analyzer. It also has a 3 MHz signal source that may be applied to the spectrum analyzer. We weren't too excited about this unit until we noted the high quality of construction of several nifty RF modules inside. It uses 115 VAC, has a balanced mixer, a ultra-stable VFO (2.985 - 3 MHz) with a beautifully clean sine-wave output, 600Ω step attenuator, stable -15 VDC power supply, and a 2.5 MHz IF amplifier module. We tested one, and after warmup the VFO drifted only 25 Hz! You could add a crystal oscillator and use the balanced mixer for a QRP Transmitter, or add a detector and modify the VFO for the desired band and have a HF receiver, use as a stable signal generator for HF, or you could add frequency multiplier stages for a stable VHF RF source, etc. Includes power cable, three BNC cables, manual w/ schematic. Unused!

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Option #3 -- Buy both units above, only **$44.95**! What a deal!

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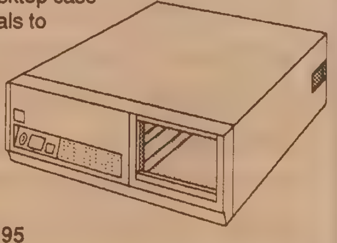
12843	Romex Staples, white plastic saddle, 1/2", bag/100
12840	Coax Staples, white plastic saddle, perfect for RG58/59, bag/100
13029	TV/Game switch box, "F" conns. for TV input/output, RCA for game
13102	Coax cable, RG59 with "F" connectors, 3 ft. long
230	Coax cable for video games, 75Ω, with RCA connectors, 15 ft.
14048	"Jewel Box" for Compact Disk, empty
13095	3M stick-on feet, 3/4" square, grey, sheet of 24
10593	Texas Instruments 14p. solder tail IC sockets, pack of 50
1190	Texas Instruments 24p. solder tail IC sockets, pack of 15
12511	Heatsink Compound (white silicone paste), 1 Oz. tube

Computer Case & Power Supply

Here is a good starting point for those of you wishing to build your own computer -- buy this compact desktop case and power supply, then choose the internals to match your requirements!



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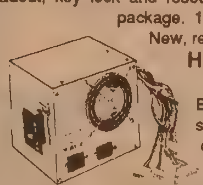

B. 220 Watt AT-type Power supply, fits above case and most other standard AT-type cases. Four drive connectors plus motherboard connectors. New, 90-day warranty.
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BBSes

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Initiative BBS. (510)654-2253. 8-N-1, 300/1200/2400. A political board established to support the Committees of Correspondence. Devoted to documents and discussion related to the left in this country and the future of the left. Sysop: Steve Willett. [Exp. #111.]

L & B Sharing BBS. (510)530-3499. 8-N-1, 300/1200/2400/9600/14,400. Nutrition, Recovery, New Age, files, doors, FidoNet, DharmaNet, SkyNet. Free. Sysop: Brian Gorécki. [Exp. #112.]

Legat Information Systems BBS. (510)644-1899. 24 hrs., 1200/2400. Cal. Appeals & 9th Circuit Court recent decisions. Fee for full access. [Exp. #113.]

MajorComm BBS. (510)494-8502. 24 hrs., 1200/2400. eight lines, swinger board, chat, email, GIFs, games, adult only. Ladies free access. Sysop: Dave. [Exp. #111.]

MDBJ. (510)658-8078. 2400. A BBS for women on the edge. NIRVANAnet. [Exp. #111.]

Milk & Blood. (510)653-2232. 8-N-1, 2400. Drunken Milkmen, driving drunk, discuss anarchy & personal hygiene. Free. [Exp. #113.]

The New-Ark BBS. (510)796-0947. 24 hrs., 2400/9600. Tradewars, running on two CD-ROMs. Reg required. Sysop: Hiram Wolf. [Exp. #113.]

Olde Stuff BBS. (510)530-3051. 8-N-1, 24 hrs., 9600. Antiques, collectibles, history, genealogy. Buy, sell, learn. Sysop: Bill Clark. [Exp. #112.]

Omikron BBS. (510)657-8820. 24 hrs., 14,400. Mac files and discussions. Fremont. Free. [Exp. #113.]

The Party Wherehouse BBS. (510)256-9809. 8-N-1, 24 hrs., 14,400. Multiline, multine, including Internet, UUCP, Fido. CD-ROM, 2.2GB online, dating, monthly user parties. Open to all ages. Sysop: Sean Andrade. [Exp. #113.]

PC/400. (510)796-0834. 14,400. 2.7GB files on PC, IBM 3X/400. Free access. [Exp. #111.]

The Phantom Zone BBS. (510)538-9586. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Online games, offline mail reader. Free access. [Exp. #113.]

The Pit Of Despair. (510)939-8934. Not for the weak hearted! Free. Sysop: Scarecrow & Dargoth. [Exp. #112.]

Realitycheck. (510)527-1662. 9600. Albany, instant access. NIRVANAnet. [Exp. #111.]

Records Dept. BBS. (510)426-0470 (2400), 426-0793 (14,400). Amiga, IBM, and Mac. Free. Extras for subscribers—FidoNet, games, chat. Sysop: Paul Tibbals. [Exp. #111.]

Sir James BBS W/ Magick Resource Center. (510)261-6567, 261-6863. Nets: Fido, Pods, Dharma, Bignet. Rooms: pagan/magick, music, adult, Sound Blaster, and more. Free/val. reg. Sysop: Sir James. [Exp. #111.]

So Be It! (510)680-1980. 24 hrs., 300/1200/2400/9600/14,400. Specializing in male GIFs and topics for women. Online games, message areas. [Exp. #112.]

Space Quest BBS. (510)865-3987. 24 hrs., 2400. Online games, net msg bases, file areas, including alt areas. [Exp. #111.]

Tailored Chains BBS. (510)614-2960 (1200), 614-2961 (2400). four lines, gay oriented, multiline chat, gay GIFs. Free. Sysop: Plane Doctor. [Exp. #111.]

Terminal One BBS. (510)432-2461, 432-0204. 1200/2400/9600/14,400. Shareware, adult files, registered games, msg areas, plus The Weasel Den II. Sysop: Pete Nelson. [Exp. #111.]

Tiger Team. (510)268-0102. 14,400. America's #1 Buddhist online service, original files, internet, multiline. [Exp. #112.]

VA Listings. (510)637-1261. 24 hrs., 300/1200/2400/9600. VA-owned homes for sale. Sysop: David Piersall. [Exp. #113.]

Viper 1 Premium BBS. (510)535-0231, 535-0315. 8-N-1, 24 hrs., 2400/9600/19,200. Multiline, 900MB, 1.3GB online, large adult file areas, games, file scanning facilities online. [Exp. #111.]

The Warped BBS. (510)939-8344. 300/1200/2400/9600/14,400. 260+MB, five nets, WWIV 4.22 node. Sysop: Max Baker. [Exp. #112.]

Wasteland. (510)676-3593, 676-7640. 24 hrs., 14,400. No fees. Sysop: Wizard 1 & Tanker. [Exp. #113.]

Windows Online. (510)736-8343. Windows BBS and publisher of WinOnLine Review. Over 8,500 Win 3.x & 17,000 DOS files, 7GB, 14 lines using USR-DS modems. Free trial. [Exp. #111.]

Wishing Well BBS. (510)745-7901. 14,400. Quality files, 85+ online games, ANSI art, adult files, and more Sysop: MaryLou White. [Exp. #112.]

Worldview BBS. (510)676-2919. 8-N-1, 24 hrs. 1200–14,400. 2 lines, open to all, docs/discussion of int'l xian democracy issues. Sysop: Bill Gram-Reefer. [Exp. #112.]

707

Dobbs Enterprises. (707)427-0277. 300/1200/2400/9600. 6 CD-ROMs, 60,000+ files, UN'I Net, Appogee Dist, multiline. [Exp. #112.]

Mnemonic BBS. (707)451-8353, 451-4678. 14,400. 2 CD-ROMs, 12,000 files, netmail, multiline. [Exp. #112.]

The Powder Keg BBS. (707)427-1310. 14,400. Protect your right to keep and bear arms! Free. Sysop: Peter Nesbitt. [Exp. #112.]

Recommended BBS. (707)448-2225. 24 hrs., 300/1200/2400. Multiuser games, teleconference, conversational and technical areas, 16 lines. All welcome. Sysop: Jay C. Parangalan. [Exp. #113.]

Threat Management Institute BBS. (707)935-1713. 8-N-1, 24 hrs. Conferences dealing with issues of personal defense, firearms, law, etc. Schedule of TMI classes. No fees. Sysop: Peter Alan Kasler. [Exp. #113.]

916

24th Street Exchange. (916)448-2483. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. 24 lines, seven CD-ROMs, FidoNet, USA Today. [Exp. #113.]

TELL 'EM YOU SAW IT IN
MICROTIMES

BBS Spotlight cont.

savvy to mock these people, but I know for myself that if the WELL, my "home" service, ceased to exist for me against my will, I'd have a difficult time coming to terms with such a huge loss, although my relationships are with other WELL users, not with the WELL itself. It's not always easy to differentiate the two.

The BBS or the online service is the medium in which relationships flourish. No matter what the circumstances, the venue is value-neutral. The value is provided by the people who use it. There's been plenty of name-calling by stunned Prodigy users, but it's normal for users to lash out at the service when the service is perceived as having gone astray. It's long been my observation that users take sysop or management decisions very personally and feel that they (users) have much more power over the venue, any venue, than they actually do. This is not unique to Prodigy.

What is unusual is that, whether by cluelessness or hubris, Prodigy management claims to provide the "best value" in user-to-user communication when it is, in fact, the users who provide that value. Drive away the users by charging outlandish access fees and suddenly it's hard to find any value at all in those quiet BBS areas.

At some time everyone online will have to come to terms with the possibility of changing circumstances—that's just the nature of telecomm. Users lose favorite venues, sysops lose favorite users. It reinforces one of telecomm's most attractive features, its dynamism. People come and go. New people arrive, old people leave. Explanations are sometimes incomplete or nonexistent. People get new net addresses, you lose track, and years later you find yourself wondering where these people are. And sometimes you feel bad about having lost touch.

I am disappointed that "my" group on Prodigy is breaking up, and it's painful to watch others clutching on to each other online for dear life. Hopefully, one of the things that will come out of this mass exodus from Prodigy is that wounds heal and new people and venues fill the breach. Welcome to telecomm.■

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ASSOCIATIONS

American Association For Articicial Intelligence (AAAI). Write: 445 Burgess Dr., Menlo Park, CA 94025. Call: (415)328-3132. Email: membership@aaai.org. [Exp. #116.]

The Association For Customer Support Professionals. Dedicated to the deveopment and furtherance of customer support as a distinct profession, to the growth of the support community, and to the improvement of support service. Call: (510)865-4515. Internet: tao@well.sf.ca.us. [Exp. #114.]

Association Of Information Systems Professionals (AISP). Write: 922 Weddell Ct., Sunnyvale, CA 94090. Forums, support, network for IS Professionals. Many SIGs. Call: Al Normantas, (408)745-7600. Fax: (408)745-0740. [Exp. #116.]

Computer Professionals For Social Responsibility. Meetings: 2nd Wed., 7:30 pm, UC Berkeley, Evans Hall, Rm. 608-7. Call: Judy Stern, (510)643-7499. [Exp. #115.]

Computer Software Industry Association. CSIA monitors all state legislation which affects the computer software industry and some federal issues. Call: (415)948-9192. [Exp. #115.]

East Bay Entrepreneurs' Network. Meetings: 1st and 3rd Wed., Berkeley Marina Marriott. The organization of East Bay business and professional leaders who exchange business leads for mutual benefit. Call: Sherry Markwart, (510)843-1557. [Exp. #112.]

IEEE Computer Society, San Francisco Chapter. Meetings: Varying Weds, 7:00 pm, SF State. Call: (415)905-4400. [Exp. #116.]

Independent Computer Consultants Association, Northern California Chapter. Meetings are open to all. Only national trade assoc. comprising non-aligned working computer professionals with in-the-trenches experience. Call: ICCA, (415)441-2948. [Exp. #115.]

Independent Computer Consultants Association, Silicon Valley Chapter. Meetings: 4th Thrus., 6:00 pm. Hobee's Resturant, 920 Town & Country Village, San Jose. Provides a network for independent computer professionals in South San Francisco Bay and Monterey Bay areas.. Call: Chapter Hotline, (408)492-8888. [Exp. #116.]

North Bay Systems Professionals. Meetings: 3rd Wed., 6:00 pm, Embassy SUites Hotel, 101 McInnis Pkwy., San Rafael. NBSP provides a forum and network for systems professionals. Call: Pat Sullivan, (510)769-2648. [Exp. #113.]

San Francisco Robotics Society Of America. Meetings: 1st Wed., 8:00 pm, Exploratorium, San Francisco. Free. Call: Brad Smallridge, (415)550-0588. [Exp. #116.]

Society For Technical Communication, Berkeley Chapter. Meetings: 2nd Wed., dinner at 6:30, program at 7:30, Upstairs, Yenching Mandarin Chinese Resturant, 2017 Shattuck Ave., Berkeley. Call: Rick Julius, (510)975-0876. [Exp. #116.]

Society For Technical Communication, San Francisco Chapter. Meetings: 3rd Wed., 6:00, program at 7:00 pm. Stagecoach Resturant, 44 Montgomery St., San Francisco. For technical writers, editors, and other technical communicators. Some meetings are dinner meetings, for which reservatins are necessary. Call: (415)985-7121. [Exp. #116.]

Software Entrepreneurs' Forum. 3rd Wed., 6:30 pm, Elk's Lodge, 4249 El Camono, Palo Alto. Industry association dedicated to software developers and entrepreneurs, offering information and education on all facets of the software industry. Call: Information, (415)854-7219; reservations, (415)965-9003. [Exp. #114.]

United Sysops Association. Meetings: 2nd Wed., 7:00 pm, Coco's, 1035 S. Mary Ave., Sunnyvale. Organization of bulletin board sysops and users. Call: Bill Strouse, (408)739-9081. BBS: (408)739-8753. [Exp. #114.]

Continued

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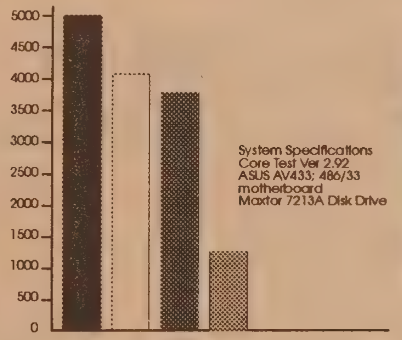

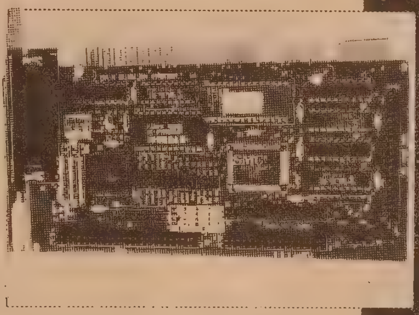

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USER GROUPS

ADOBE

Systems Adobe Technology Exchange: San Francisco Peninsula/South Bay Chapter. Meetings: 2nd Wed., 7:00 pm, M&T Publishing, 411 Borel Ave., San Mateo. Call: ATX, (408)562-6104. [Exp. #112.]

AMIGA

3rd Dimension—Imagine/Lightwave User Group. Meetings: 1st & 3rd Mon., 6:30 pm, Computer Showcase, 510 1/2 Fredrick St., SF. Call: Ollie, (415)863-8792. [Exp. #111.]

AAA—Amiga Addicts Anonymous. Meetings: 3rd Tues., Concord Water District Bldg., 1311 Concord Ave. Classes, monthly disks, info line. Call: (510)935-0829. [Exp. #115.]

ACCESS—Amiga & Commodore Computer Enthusiasts Society. Meetings: 2nd Thurs., 7:00 pm, Livermore Airport Terminal. Call: Paul, (510)829-6053. [Exp. #111.]

AUM—Amiga Users Of Marin. Meetings: 3rd Wed., 7:30 pm, College of Marin Science Center, Rm. 191, Kentfield. Desktop Video SIG, Rm. 192, 6:00 pm. Call: (415)479-6717. BBS: (415)485-5895. [Exp. #115.]

AWEST Amiga Users In SF. Meetings: 1st Thurs., 7:00 pm, Laguna Honda School, Conference Rm., 1350 7th Ave., San Francisco. Call: (415)584-8406. BBS: (415)824-8774. [Exp. #115.]

FAUG—First Amiga User Group. Meetings: 1st Tues., 7:30 pm, HT Electronics, 275 N. Matilda Ave., Sunnyvale. Q &A, new product demos, public domain software. Call: Mike Fisher, (415)855-9816; BBS: (415)595-2479; Usenet: mikef@hpspd.hp.com. [Exp. #111.]

RE—AMIGA Redwood Empire Amiga User Group. Meetings: 2nd Tues., 7:30 pm, Rohert Park Jr. HS, RM. C-5, 7165 Burton Ave., Rohnert Park. Call: (707)523-9978. BBS: (707)795-2717. [Exp. #115.]

APPLE

PAUG—Peninsula Apple User Group. Meetings: 3rd Thurs., 7:00 pm, Ampex Cafeteria, 411 Broadway, Redwood City. All Apples. Beginners, advanced, Q&A, new product demon, PD software. Call: Roger Laker, (415)367-8657. [Exp. #113.]

AT&T

AT&T Computer User Group. Meetings: 1st Wed., general discussion at 6:00 pm, main program at 7:00 pm, 50 Fremont St., 40th Floor, San Francisco. Call: Jim Lansing, (415)885-6631. [Exp. #115.]

AT&T UNIX Computer User Group. Meetings: 3rd Wed., main program begins at 7:00 pm, location varies, South Bay area. Call: Thad Floryan, (415)961-5157. [Exp. #115.]

ATARI

ABACUS (Atari Bay Area Users Society). Meetings: 1st Sat. 10:00 am, Christ Church Lutheran, Quintara St. at 20th Ave., San Francisco. Supporting Atari computer users. MIDI and DTP SIGs. Call: Riger Sinasohn, (415)469-7924. [Exp. #116.]

Bay Area Atari Users Group. Meetings: 1st Mon., 7:30 pm, Agnews Aud., 2nd fl., San Jose. Write: c/o 3691 Eastwood Cir., Santa Clara 95054. Call: Joe Fischer, (408)988-3065. [Exp. #114.]

DACE—Diablo Atari Computer Enthusiasts. Meetings: 1st Thurs., Contra Costa Water District Bldg., 1331 Concord Ave., Concord. Call: Dan Galant, (510)689-8256. [Exp. #113.]

STace—Atari Computer Enthusiasts. Meetings: 3rd Thurs., 7:30 pm. AT&T Bldg., 3260 Sebastopol Rd., Santa Rosa. Call: Kim Remick, (707)795-8173. [Exp. #115.]

COMMODORE

ACCESS—Amiga & Commodore Computer Enthusiasts Society. Meetings: 2nd Thurs., 7:00 pm, Livermore Airport Terminal. Call: Paul, (510)829-6053. [Exp. #111.]

C=HUG (Commodore Hayward User Group). Meetings: 2nd Sat., 2:00 pm, Palma Ceia Park. (510)531-3734. [Exp. #112.]

CWEST Commodore 64/128. Meetings: 1st Sat., Excelsior Library, 4400 Mission, San Francisco. Call: (415)626-9946. [Exp. #116.]

CONTACT MANAGEMENT

Bay Area TeleMagic User Group. Meetings: 4th Wed., 4:00 pm, Call: George Workman, (408)476-6385. [Exp. #115.]

CORELDRAW

CorelDraw User Group. Meetings: 3rd Thurs., 6:00 pm, ACAD: Association of Corel Artists and Designers, Northern CA Chapter. Call: Matt O'Malley. 1-800-462-5763. [Exp. #114.]

CP/M

San Francisco Computer Society. Meetings: 4th Mon., 7:00 pm, 7th Ave. Presbyterian Church, 1329 7th Ave., San Francisco. Call: Bob Forsberg, (415)885-6202. [Exp. #113.]

DBASE

Silicon Valley Access DB Developers Group. Meetings: 2nd Wed., 7:00 pm, Call: Craig Bauer, (408)745-7600. Fax-On-Demand info: (408)745-0740. [Exp. #115.]

DEC

BayVAC. Meetings: approx. monthly. Users of DEC hardware and software. Call: Rich Taylor, (408)776-4978. [Exp. #113.]

IBM AND COMPATIBLES

DVPC—Diablo Valley User Group. Meetings: 1st Thurs., 7:30 pm, Bank of America, Bldg. B, Clayton Rd. at Galindo, Walnut Creek. SIGs include WordPerfect, Windows, Paradox, Beginner's, Visual Basic, education/entertainment, and new users. Call: (510)943-1367. [Exp. #112.]

EastBay FOG. Meetings: 2nd Wed., 7:30 pm, Episcopal Church of St. John-in-Montclair, 1707 Gouldin Rd., Montclair. All microcomputers, MS-DOS, CP/M. Call: (510)653-2627. [Exp. #116.]

Golden Gate Computer Society. Meetings: 4th Mon, 7:00 pm, San Rafael Community Center, 618 B St., San Rafael. Free intro to computers class at 6:00 pm. Call: (415)927-2909. [Exp. #116.]

PC Clubhouse. Meetings: 1st Fri., 7:30 pm, Meiklejohn Hall, CSU Hayward. To share knowledge and PD/shareware software. Club has several BBSes in East Bay and Amador Valley. Call: (510)483-9500, 429-1007. BBS: (510)889-1932 (Hayward). [Exp. #112.]

San Francisco Business Computers. Meetings: 4th Tues., 5:30 pm. For those who use computers in business. Visitors $5. Call: Jordan Rosenberg, (415)788-5338. [Exp. #115.]

San Francisco PC Users Group. Meetings: 3rd Tues., 6:15 pm SIGs, 7:30 pm General Meeting. Fort Mason, Bldg. A. Call: (415)979-5879. [Exp. #114.]

Silicon Valley Computer Society—SVCS. Meetings: 2nd Wed., 7:30 pm, Hewlett-Packard, Bldg. 48, Oak Room, 19483 Pruneridge Ave., Cupertino. Call: (408)956-0864. BBS, (408)956-0317. [Exp. #113.]

South Bay WordPerfect User Group. Meetings: Monthly, dates vary. Saratoga Community Library. Free. Call: Martin Van Derpool, (408)238-8434. [Exp. #113.]

Stanford Palo Alto Area User Group. Meetings: Last Wed., 7:30 pm, Varian Aud., 3075 Ilansen Way, Stanford. DOS/Windows. Free. Call: (415)329-8252. [Exp. #115.]

INTERFACE DESIGN

IICS Human Interface SIG. Meetings: Last Tues., Medius IV, 52 Colin P. Kelley Jr. St., Suite 101, San Francisco. Come join us for a rowdy probing of workable and nonworkable interface designs. Call: (415)905-6959. [Exp. #115.]

LAPTOPS

HPX HP Laptops & Handhelds. Meetings: 2nd Sat., Sunnyvale. Call: Michael Felsenstein, (415)564-8279. [Exp. #111.]

LEGAL

SF Bar Assoc. WordPerfect User Group. Meetings: 3rd Wed., noon, SF Bar Assoc. Boardroom, 7th fl., 685 Market St. Brown bag meetings. Call: (415)421-5650. [Exp. #114.]

MACINTOSH

A32 Macintosh User Group. Meetings: 2nd Sat., 10:00 am, GTE Bldg 3 Cafeteria, 100 Ferguson Dr., Mountain View, corner of Central Expressway and Highway 237. Call: (408)263-0398. [Exp. #115.]

BMUG—Berkeley Macintosh User Group. Meetings: Every Thurs., 6:00 pm, Physical Sciences Lecture Hall, UC Berkeley Campus. Call: (510)549-BMUG. [Exp. #115.]

Diablo Valley Macintosh User Group (DVMUG). Meetings: 3rd Tues., 7:00 pm, Old Republic Title Co., 3000 Clatyon Rd., Concord. Get together w/Mac and Performa users. Enjoyable SIG meetings. Call: (510)827-5775. [Exp. #116.]

International Macintosh User Group (IMUG). Meetings: 3rd Thurs., 6:45 pm, location varies. A forum for multilingual computing. Call: Roger Sherman, (415)859-5146. [Exp. #116.]

Macintosh SIG. Meetings: 3rd Tues., 7:00 pm, Apple Cafeteria, City Center 4, De Anza and Rodrigues, Cupertino. Sponsored by Software Entrepreneurs' Forum. Call: Jeff Cherniss, (408)358-5150. [Exp. #115.]

Macs Of Marin. Meetings: Last Wed., 7:30 pm, Corte Madera Rec Center, 498 Tamalpais Dr., Corte Madera. Marin County Mac User Group for all levels of expertise, beginners welcome, SIGs. [Exp. #112.]

PAUG—Peninsula Apple User Group. Meetings: 3rd Thurs., 7:00 pm, Ampex Cafeteria, 411 Broadway, Redwood City. All Apples. Beginners, advances, Q&A, new product demos, PD software. Call: Roger Laker, (415)367-8657. [Exp. #113.]

SPC Apple User Group. Meetings: 2nd Wed., 7:30 pm, Fremont Main Public Library, 2400 Stevenson Blvd. Call: Dean Fearn, (510)881-9160. [Exp. #112.]

Stanford Macintosh User Group (SMUG). Meetings: 1st Mon., 7:00 pm. Call: (415)363-2446. [Exp. #116.]

MULTIMEDIA

DesignSIG. Meetings: 3rd Tues., 6:00 pm. New SIG open to independent businesspeople in graphic arts, word processing, and related fields. Focus to share concerns and solutions related to running own business. Call: Bill Brent, (415)282-7368. [Exp. #115.]

International Interactive Communications Society—IICS. Meetings: 2nd Tues., 7:00 pm, alternate locations San Francisco and South Bay. For people involved or interested in developing and using interactive multimedia technologies. Call: IICS Hotline, (415)252-8114. [Exp. #113.]

Macromedia User Forum. Meetings: 1st Wed., 7:00 pm, 600 Townsend, at 7th St., San Francisco. Authoring, 3-D, content, and tools. Call: John Dowdell, (415)665-3916 (days); email: 71165.3065@compuserve.com. [Exp. #112.]

Multimedia SIG. Meetings: 1st Thurs., 7:00 pm. SIG of Software Entrepreneurs' Forum. Call: Ralph Gilman, (408)746-0551. [Exp. #115.]

Multimedia User Group. Meetings: 1st Wed., 7:00 pm, Contract Design Center, Main Lobby, 600 Townsend St., San Francisco. $3 at door. Call: John Dowdell, (415)665-3916. [Exp. #116.]

NANOTECHNOLOGY

Nanosystems Study Group. Meetings: Alternate Mondays, 7:30 pm, University Lutheran Church, 1611 Stanford Ave., Palo Alto. The study group will go through Eric Drexler's book, *Nanosystems: Molecular Machinery, Manufacturing, and Computation.* Announcements and mailing list, contact: Ted Kaehler, email: Kaehler2@AppleLink.Apple.com. Phone: (408)974-6241. [Exp. #115.]

The Assembler Multitude. Meetings: every other Mon., 7:30 pm, University Lutheran Church, 1611 Stanford Ave., Palo Alto. An open discussion of new technical developments in Nanotechnology and social consequences and dangers of Nanotechnology. Organized by Ted Kaehler. Email: Kaehler2@AppleLink.Apple.com. Address: 20525 Mariani Ave., MS 301-3D, Cupertino, CA 95015. [Exp. #115.]

NETWORKING

NetSIG. Meetings: 4th Tues., 7:00 pm, Novell Sunnyvale. Networking SIG for Software Developers. SEF group. Call: Skip Addison, (408)277-5867. [Exp. #111.]

NOVELL

Silicon Valley Novell User Group. Meetings: 3rd Wed., 6:30 pm, Sundowner Inn, corner of Ross and Mathilda, Sunnyvale. Call: Bill Strouse, (408)739-9081. BBS: (408)739-8753. [Exp. #114.]

OS/2

Monterey Bay And NPGS OS/2 User Group SIG. Meetings: 2nd Thurs., 7:00 pm, Spanagel Hall, Naval Postgraduate School, Monterey. Demos and product evaluations, question and answer sessions, assistance w/ setup. Call: Michael Schievelbein, (408)656-2520 (days). [Exp. #115.]

OS/2 Bay Area User Group. Meetings: 4th Mon., 7:00 pm. For anyone interested in OS/2. Presentations, demos, q&a. Call: (415)755-3124. [Exp. #116.]

OS/2 SIG Of San Francisco. Meetings: 2nd Wed., 7:00 pm, location varies. Call: Margery Blum, (415)931-3110. [Exp. #112.]

PARADOX

Bay Area Paradox User Group (bapals). Meetings: 4th Tues. (except June and July, 4th

USER GROUPS

Wed.), 4:30 pm, SF City College, 800 Mission St. Call: (415)995-4688. [Exp. #115.]

SVCS Paradox SIG. Meetings: 3rd Tues., 7:00 pm, Tandem Computers, Bldg. 251, 10100 N. Tantau, Cupertino. Membership: $12/yr. Call: Scott Jackson, (408)738-0424. [Exp. #114.]

PROGRAMMING LANGUAGES

APL Interest Group Of Northern CA. Meetings: 2nd Mon., 7:00 pm, Syntex Labs, 3401 Hillview Ave., Palo Alto. A member SIG of ACM. Call: (408)742-5277. [Exp. #111.]

Forth Interest Group Of North Bay. Meetings: 2nd Sat., 1:00 pm, 2055 Center St., Berkeley. Tutorial at noon. Call: Leonard Morgenstern, (510)376-5241. [Exp. #113.]

North Bay Forth Interest Group. Meetings: 2nd Sat., 1:00 pm, 2055 Center St., Berkeley. Tutorial at noon. Call: Leonard Morgenstern, (510)376-5241. [Exp. #113.]

PowerBASIC Study Group. Meetings: Now forming. Call: Thipdar, (510)783-1972. [Exp. #111.]

Sacramento Forth Interest Group. Meetings: 4th Wed., 7:00 pm, SMUD, 1708 59th St., Rm. A., Sacramento. Call: Bob Nash, (916)487-2044. [Exp. #113.]

San Francisco North Bay Smalltalk/V User Group. Meetings: Every other month in downtown SF. Call: David Freihofner, (415)362-4283. Email: dfrei@well.sf.ca.us. [Exp. #112.]

SEF/SVCS Visual Basic SIG. Meetings: 2nd Thurs., 7:00 pm, Cubberley Comm. Ctr., Rm. H-1, 4000 Middlefield, Palo Alto. Call: Allan Colby, (415)851-4657. [Exp. #114.]

SF Bay Area Visual BASIC User Group. Call: Gustavo Eydelteyn, (510)547-7295. [Exp. #111.]

Silicon Valley FIG. Meetings: 1st Mon. after 1st Sat., 7:00 pm, Membership in the Silicon Valley Chapter of the Forth Interest Group is separate from International FIG. Call: Henry Vinerts, (510)790-3945. [Exp. #115.]

Silicon Valley Forth Interest Group. Meetings: 4th Sat., 10:00 am, Applied Biosystems, Inc., Conference Room A/B, 230 Lincoln Centre Dr., Foster City. Call: Art Hampton, (415)873-8554. [Exp. #113.]

Visual BASIC SIG. Meetings: 2nd Thurs., 7:00 pm, Cubberley Community Center, 4000 Middlefield Rd., Rm. H-1, Palo Alto. Sponsored by Software Entrepreneurs' Forum. Call: Allan Colby, (415)851-4567. [Exp. #115.]

Visual C++ Bay Area Developer's Group. Meetings: 3rd Wed. Send name, address, and fax # to receive meeting and membership info, to: VSADG, PO Box 306, Berkeley, CA 94701, or CompuServe: 72113,2241. [Exp. #116.]

SYBASE

Sybase User Group. For information, write: Sybase User Group, attn: Mar-Com, User Group Membership, 6475 Christie Ave., Emeryville, CA 94608. [Exp. #113.]

TELECOMMUNICATIONS

BMUG Telecom SIG. Meetings: Last Wed., 8:00 pm. How to use your modem, terminal programs, and the BMUG BBS. Call: (510)549-BMUG. [Exp. #111.]

TEXAS INSTRUMENTS

TI-99/4A. Meetings: 2nd Sat., Oakland. Call: Fred, (510)530-8335. [Exp. #115.]

UNIX/ XENIX

BACUG—Bay Area Coherent User Group. Meetings: 3rd Sun., 2:00 pm, San Mateo. Call: Viki Tamaradze, (510)549-1876; email: johnp@dumbcat.sf.ca.us. [Exp. #113.]

N. California UNIX SIG. Meetings: New group, just forming. UNIX, XENIX, LINUX, Coherent. Call: Randy Just, (707)769-1648. [Exp. #112.]

UNIX SIG. Meetings: 2nd Tues., DEC, 800 W. El Camino Real, Mountain View. Sponsored by Software Entrepreneurs' Forum. Call: Priscilla Rowe, (415)776-0513. [Exp. #116.]

UNIX/Xenix SVUG. Meetings: 3rd Wed. 7:00 pm, Call: (408)745-7600. Fax-On-Demand info: (408)745-0740. [Exp. #116.]

VIDEO TOASTER

Video Toaster User Group. Meetings: Last Thurs., 7:30 pm, HT Electronics, 275 N. Mathilda Ave., Sunnyvale. Special guests, equipment demos, hands-on workshops, plus info/tips on new System 3.0. Call: Andrew Timmins, (408)243-9233 (eve). [Exp. #115.]

VIRTUAL REALITY

Silicon Valley Virtual Reality. Meetings: 2nd Thur., 7:00 pm, 922 Wedell Ct., Sunnyvale. Open forums, info sharing, and technology developments. Call: Algis normantas, (408)745-7600. [Exp. #116.]

Virtual Reality Group. Meetings: varies. VRG is a nonprofit organization dedicated to supporting and promoting the development of VR technologies in the Bay Area. Everyone welcome. Call: Linda Jacobson, (415)826-4716. Email contacts: Linda Jacobson (lindaj@well.sf.ca.us), Peter Rothman (avatarp@well.sf.ca.us), or Timothy Childs (tchilds@well.sf.ca.us). [Exp. #114.]

WINDOWS

BMUG Windows Programmers SIG. Meetings: 1st Tues., 6:30 pm, 2055 Center St., Berkeley. The Programmers SIG is a forum for Windows programmers of all levels to meet and exchange information. Call: Ferdinand Rios, (510)526-3031. [Exp. #115.]

WinSIG. Meetings: 1st Wed., 6:30 pm, Cubberley Community Center, Rm. H-1, 4000 Middlefield Rd., Palo Alto. Windows SIG of the Software Entrepreneurs' Forum. Call: Fran Finnegan, (415)288-4400. [Exp. #115.]

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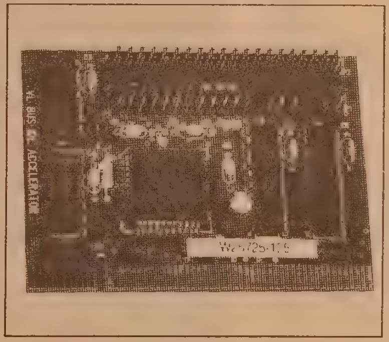

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Western Digital WD2200 212MB 14ms IDE	$205
Western Digital WD2250 250MB 14ms IDE	$235
Western Digital WD2340 340MB 13ms IDE	$299
Fujitsu M2623SA 425MB 11ms SCSI	$630
Fujitsu M2624F 520MB 11ms SCSI	$680
Fujitsu M2694SA 1.2GB 10ms SCSI	$1059
Fujitsu M2652SA 2.0GB 11ms SCSI	$1850
Fujitsu M2654SA 2.4GB 12ms SCSI	$2400
Quantum LPS525S 525MB 13ms SCSI	$660
Toshiba 877MB 12ms 512K Cache SCSI-2	$870
Toshiba 1.2GB 12ms 512K Cache SCSI-2	$1020
Teac 1.2MB Floppy Drive	$53
Teac 1.44MB Floppy Drive	$50

VIDEO CARDS

ATI Pro1MB/2MB(ISA)	$244/$320
ATI Pro 1MB/2MB(VLB)	$256/$335
ATI Pro 1MB/2MB(EISA)	$300$380
ATI Graphics Ultra Plus 1MB/2MB	$210/$256
ATI Graphics Ultra w/1MB & Mouse	$184
Cirrus Logic w/1MB	$58
Cirrus Logic VLB w/1MB	$92
Diamond Speedstar 24 w/Hi-Color & 1MB	$139
Diamond Speedstar 24X w/Hi-Color & 1MB	$140
Diamond Stealth 24 w/Hi-Color & 1MB	$147
Diamond Stealth 24 VLB w/1MB	$160
Diamond Stealth Pro VRAM w/2MB	$340
Diamond Stealth Viper VLB w/2MB	$365
Genoa 8500 VLB w/1MB	$105
Orchid Fahrenheit VA801 w/Sound	$142
Orchid Fahrenheit VLB w/1MB	$146
Orchid ProDesigner IIS w/1MB	$109
Orchid P9000 VLB w/3MB	$340
Trident 9000A w/256K	$31
Trident 9000A w/512K	$38
Trident 8900C/8900CL w/1MB	$58
Tseng Lab VLB w/1MB	$110

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LAITRON COMPUTER WEEKLY SPECIALS

Multimedia 486SX-25/128K

- 2 VESA Local Bus Board
- Intel 80486SX-25CPU
- Toshiba XM-3401 CD-ROM
- Pro Audio 16 Sound Card
- 4MB RAM 70ns
- Teac 1.2 &1.44 Floppy Drive
- IDE/IO 2FD/2HD/2S/1P/1G
- Western Digital 250MB IDE HD
- Mitsumi 101-key Keyboard
- Cirrus Logic VLB SVGA w/1MB
- 1024x768 .28dp SVGA Monitor
- Medium Tower Case
- 250-Watt Power Supply

$1645

Multimedia 386DX-40/128K

- AMD 386DX-40 CPU
- Sound Blaster Pro Sound Card
- Panasonic CR522 CD-ROM
- Deluxe Speaker
- 4MB RAM 70ns
- 1.2 &1.44 Floppy Drive
- IDE/IO 2FD/2HD/2S/1P/1G
- Conner 170MB Hard Drive
- Mitsumi 101-key Keyboard
- Cirrus Logic SVGA w/512K
- 1024x768 .28dp SVGA Monitor
- Mini Tower Case
- 200-Watt Power Supply

$1190

Notebook Twinhead 486DX-33T

- 4MB RAM, Exp. To 20MB
- 130MB HD (200 MB Available)
- 1.44MB Floppy Drive
- 256-color Active Color Matrix
- 2S/1P/1G
- One External SVGA Port
- One External FD Port
- One 100-Pin Expansion Port
- One External Keyboard Port
- 120/240V AC/DC Adapter
- Internal Trackball

$3995

Notebook Matador 486DX2-66

- 4MB RAM, Exp. To 20MB
- 120MB HD (200 MB Available)
- 1.44MB Floppy Drive
- 256-color Active Color Matrix
- 2S/1P/1G
- One External SVGA Port
- One External FD Port
- One 110-Pin Expansion Port
- One External Keyboard Port
- 120/240V AC/DC Adapter
- Internal Trackball

$4095

KEYBOARDS

Focus 2001	$38
Focus 5001	$57
Focus 9001	$60
Keytronic 101-Key	$32
Maxiswitch 101-Key	$30
Metek K208 101-Key	$22
Metek K104 101-Key Click	$42
Mitsumi 101-Key	$26
Northgate OmniKey 101	$68
Northgate OmniKey 102	$68
Northgate OmniKey Ultra	$92

CONTROLLER CARDS

IDE 4FD/2HD	$34
IDE 2FD/2HD/2S/1P/1G	$14
Future Domain IDE 2HD/2D & SCSI	$60
DTC 2290 EISA IDE	$135
Promise DC-99M IDE w/512K Cache	$115
Promise DC-100 IDE Cache with I/O	$125
Promise DC-200 IDE Cache w/4HD/2FD	$125
Promise DC-4030 VLB IDE Cache w/4HD	$175
Teco Cache VLB IDE w/4HD/2FD	$175
Tyan VLB IDE with I/O	$54
Adaptec 1522/1522K SCSI	$98/$138
Adaptec 1542C/1542CK SCSI	$195/$235
Adaptec 1742 EISA SCSI	$390
BusLogic BT445S VLB SCSI-II	$290
BusLogic BT545KT BusMaster SCSI	$235
BusLogic BTB742KT EISA SCSI-II Kit	$340
BusLogic BTB747AK EISA SCSI	$399
DTC 3290AS EISA SCSI	$460
Future Domain TMC950 SCSI w/IDE	$55
Ultrastor 24F EISA SCSI	$365
Ultrastor 34F VLB SCSI	$275

MOTHERBOARDS W/CPU

Asus 486DX-50/256K w/2VLB	$560
Asus 486DX2-66/256K w/2VLB	$650
Diamond 486DX2-66/256K w/2 VLB	$715
Nice 486DX2-66/256K EISA/VLB	$748
Nice 486DX-50/256K EISA/VLB	$680
Nice 486DX-33/256K EISA/VLB	$540
Orchid 486DX2-66/256K w/2 VLB	$695
Orchid 486DX-50/256K w/2 VLB	$645
MicroStar 486DX2-66/128K w/2 VLB	$610
486DX-33/64K w/2 VLB	$385
486DX2-66/256K	$615
486DX-50/256K	$525
486DX2-50/256K	$485
486DX-33/64K (Intel CPU)	$365
386DX-40/128K	$122
386SX-33	$85

POWER SUPPLY & CASE

200W Power Supply	$35
230W Power Supply	$40
250W Power Supply	$55
300W Power Supply	$65
Desktop AT Case w/200W Power Supply	$54
Mini-Tower Case w/200W Power Supply	$51
Medium Tower Case w/250WPS	$82
Full-Size Tower case w/250WPS	$112
Super Tower Case w/300WPS	$190

SOFTWARE

Central Point Anti-Virus	$15
Lotus 1-2-3 for Windows	$290
Microsoft DOS 5.0 (w/System Purchase)	$45
Microsoft Excel 4.0 for Windows	$265
Microsoft Office 3.0 for Windows	$460
Microsoft Project 3.0 for Windows	$410
Microsoft Word for Windows	$265
Microsoft Works for Windows	$65
Microsoft Windows 3.1 (w/System Purchase)	$45
SCO C++	$900
SCO ODT Dev. System 2.0/Tape	$1460/$1240
SCO Personal System 2.0/Tape	$1155/1050
SCO XENIX-NET 386 Single Server V1.3.0	$670
SCO UNIX 386 Dev. System V3.2.4	$885
SCO UNIX 386 GT V3.2.4 Multiuser	$885
SCO XENIX386 Dev. System V2.3.1	$585
SCO XENIX 386 GT V2.3.4 Multiuser	$640
Wordperfect 5.1 (DOS)	$250
Wordperfect 5.2 for Windows	$260

MULTIMEDIA

Creative Labs MIDI Kit	$42
Creative Labs SoundBlaster	$66
Creative Labs SoundBlaster Pro	$105
Creative Labs SoundBlaster Pro Deluxe	$117
Creative Labs SoundBlaster 16 ASP	$194
Creative Labs VideoBlaster	$306
Creative Labs WaveBlaster	$CALL
Logitech Sound Man	$140
Media Vision Pro Audio Spectrum 16	$148
Media Vision Pro Audio Studio 16	$205
Media Vision Pro Movie Spectrum	$265
Creative Labs Discovery CD 8 Upgrade Kit	$380
Creative Labs Discovery CD 16 Upgrade Kit	$460
Creative Labs Edutainment 16 CD Upgrade	$535
Media Vision Pro 16 Multimedia System	$810
Media Vision Subsystem CDPC XL	$1065
Media Vision Fusion CD 16	$470
NEC Multimedia Upgrade Kit	$800
Labtec Speakers	$25
Zoltrix Deluxe Speakers	$185

MODEMS

DataSystem Pocket Size14400 Fax/Modem	$205
DataSystem External 14400 Fax/Modem	$175
DataSystem 14400 Fax/Modem w/16550	$160
Zoltrix 2400 Internal Modem w/send fax	$27
Zoltrix 9600/2400 Internal Fax/Modem	$48
Zoltrix 9600/2400 Int. Fax/Modem (Windows)	$57
Zoltrix 14400 Internal Fax/Modem	$148
Zoltrix 14400 External Fax/Modem	$173
US Robotics 14400/14400 Int. Fax/Modem	$173
US Robotics 14400/14400 Ext. Fax/Modem	$185

TAPE BACKUP

3M DC2120 Tape	$18
Colorado AB-11 External Tape Port	$38
Colorado DJ-10 Internal Tape Backup	$138
Colorado DJ-20 Internal Tape Backup	$182
Colorado FC-10 Tape Backup Controller	$85
Colorado KE-09 External Kit w/o Controller	$65
Colorado TC-15 Controller w/Compression	$185
Colorado PT-25 2GB Int. Tape Backup	$980
Colorado PT-25E 2GB Ext. Tape Backup	$1115
Colorado PT-50 4GB Int. Tape Backup	$1492
Colorado PT-50E 4GB Ext. Tape Backup	$1635
Colorado Trakker 120MB Ext. Tape Backup	$295
Colorado Trakker 250MB Ext. Tape Backup	$392
Iomega 250MB Insider Int. Tape Backup	$210
Summit SE250 250MB Int. Tape Backup	$170

MICE

Impression 3-Button Mouse	$18
Logitech First Mouse	$35
Logitech Mouseman	$56
Logitech Mouseman (Cordless)	$85
Logitech Trackman	$75
Microsoft Mouse	$43
MS Compatible Mouse	$10

MEMORY & CHIPS

1 MBx9 SIMM 60ns	
1 MBx9 SIMM 70ns	
MBx9 SIMM 60ns	
4 MBx9 SIMM 70ns	
1 MBx36 SIMM 70ns	
2 MBx36 SIMM 70ns	
4 MBx36 SIMM 70ns	
Cyrix 387DX-40	
Cyrix 387DX-33/25	
Cyrix 387SX-25/20/16	
Intel 80387DX-33/25	
Intel 80387SX-25/16	

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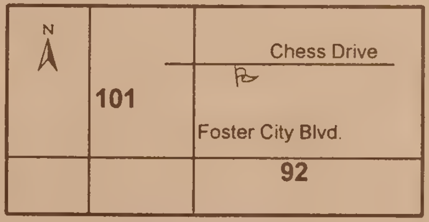

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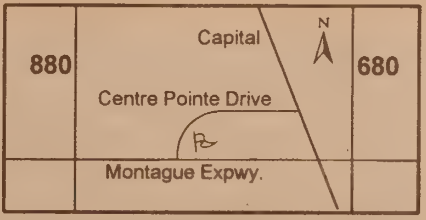

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Diamond FastBus VLB Power Station

- ○486 Diamond FastBus VLB 256K Cache Motherboard w/ IDE I/O onboard
- ○8MB 70ns RAM 72 Pin SIMM
- ○1.2M & 1.44M TEAC Floppy Drives
- ○340MB IDE Western Digital 64K Cache Harddisk
- ○Diamond Stealth 24 VLB 1MB Windows Accelerator
- ○KFC 15" 1280x1024NI Multisync, Digital Controlled, Flat Screen
- ○Premium Medium Tower 230W PS
- ○101 KeyTronic Keyboard

486-33SX	$1904
486-33DX	$2007
486-50DX/2	$2134
486-66DX/2	$2209

Accept only the finest! We don't vaguely write down what you will get, we just specifically state here what will be on the system. Unlike buying from our competitors, you know what you will get when you are reading this. No gimmicks, No tricks! Value-added engineering closely couples Diamond FastBus VLB motherboard and Stealth 24 accelerator to ensure speed and performance in DOS, Windows and AutoCAD. Flash-ROM BIOS means updating the BIOS is like copying a file to BIOS, that easy! Supporting 72Pin SIMM means memory is upgradeable to 128MB. Supporting Weitek 4167, Programmable Fast I/O, Bus-Mastering VLB, and a lot more! We combined this machine with 340MB, 8MB RAM, !5" Digital Controlled monitor just to make sure it will roll years down the road!

Recommended Upgrades:	
Diamond Stealth Pro/Viper	add$195/214
Promise 1/4/16MB Cache VLB 4030VL	add$204/317/745
Western Digital HD 213/250/420MB	add$-110/-70/140
UltraStor SCSI-2 VLB 34F + SCSI HD	add$Call
Premium Mini/Desktop/Full Tower	add-25/-20/20
KFC 14/17" Multisync Digital Monitor	add$102/355
Sony/NEC/Viewsonic/Nanao/Mag	add$Call
Mouse/DOS V6.0/Windows V3.1	add$Call

AIR ISA VESA Local Power Station

- ○486 AIR ISA 3 Slot VESA LocalBus 256K Cache Motherboard
- ○8MB 70ns SIMM RAM (1M-70ns SIMMx8)
- ○1.2M & 1.44M TEAC Floppy Drives
- ○250MB IDE Western Digital 64K Cache Harddisk
- ○Promise DC2000 VLB 32Bit IDE Controller with I/O
- ○SPiDER VLB 1MB Windows Accelerator
- ○14" 1024X768 0.28DP Impression Monitor
- ○Premium Mini Tower 230W PS
- ○101 KeyTronic Keyboard

486-33SX	$1513
486-33DX	$1616
486-50DX/2	$1743
486-66DX/2	$1818

See The Difference! With this name brand AIR motherboard, you get 3 VLB slots, all with Bus mastering capability, Intel P5 Overdrive support and GUARRANTEED future compatiblity, you are definitely buying into future with this motherboard! Our Promise VLB 32Bit IDE controller boosts harddisk performance upto 3MB/sec data transfer rate (by CORETEST V2.90), three times on average faster than regular ISA Bus! Our SPiDER Windows Accelerator also buys you incredible video performance of 13Million Winmarks and 9000 Character/ms in DOS (Landmark V2.0). Optional upgrades give you various combination for your various needs. Another technology advance and price breakthrough brought to you from us! No one can offer you this perfect machine at this perfect price, we guarrantee it!

Recommended Upgrades:	
Orchid Fahrenheit VLB STD/VA/Celsius 1/2MB	add$60/105/157/241
Diamond SpeedStarPro/Stealth 24/Pro/Viper	add$25/70/265/284
Promise 1/4/16MB Cache VLB 4030VL	add$166/279/707
Western Digital HD 213/340/420MB	add$-40/70/210
UltraStor SCSI-2 VLB 34F + SCSI HD	add$Call
Premium DeskTop/Med/Full Tower	add$5/25/45
KFC 14/15/17" Multisync Digital Monitor	add$108/210/565
Sony/NEC/Viewsonic/Nanao/Mag	add$Call
Mouse/DOS V6.0/Windows V3.1	add$Call

AIR EISA VESA Local Power Station

- ○486 AIR EISA 3 Slot VESA LocalBus 256K Cache Motherboard
- ○16MB 70ns RAM 72 Pin SIMM
- ○1.2M & 1.44M TEAC Floppy Drives
- ○345MB Maxtor SCSI 14MS Harddisk 64K Cache
- ○Ultrastor 34F SCSI-2 Bus-Mastering Controller
- ○Diamond Viper VLB 2MB VRAM Windows Accelerator
- ○KFC 17" 1280X1024NI Multisync, Digital Controlled, Flat-Screen
- ○Premium Full Tower 250W PS
- ○IDE I/O 2S/1P/1G
- ○101 KeyTronic Keyboard

486-33SX	$3307
486-33DX	$3410
486-50DX/2	$3537
486-66DX/2	$3612

The highest-end you can find! AIR EISA VESA LocalBus Motherboard supports P5 Overdrive, ZIF Socket for easy upgrade & 256MB Memory on board. Yes! 256MB using 72Pin 64MB SIMM! (Soon to be released) Great news for Imaging and Photographic software users! And with full 8 EISA slots and 3 VESA LocalBus extensions, you can plug in any different bus cards you want! We bundle this machine with a Bus-Mastering SCSI-2 VLB Controller and rockets the Data Transfer Rate to close to 10MB/Sec! This amazing controller supports 7 hard drives and transfers up to 66MB/Sec. Besides we add the ultimate Windows Accelerator Diamond Viper and make the Windows fly at the highest possible WinMarks. Believe it, you won't find a machine performs closer to this at any price!

Recommended Upgrades:	
Promise Cache VLB 4030VL+IDE HardDisk	add$Call
SCSI HardDisk	add$Call
Sony/NEC/Viewsonic/Nanao/Mag	add$Call
Mouse/DOS V6.0/Windows V3.1	add$Call

Reminder: It makes no sense to buy an VLB system without Harddisk Controller and Video card on VLB. You aren't taking the advantaue of the VLB! Be careful!

Wanna bet on the latest VLB technology? Who can guarantee that the system you want can actuall be built and work well? At UMiracle we keep searching around and find all the possible solutions for you - Which harddrive will work the best on VLBus? Which video card has th best value on the VL Bus? Which will support 50MHz? What video chipset should you use? Will it b safe to be on 50MHz VLB? What Bus-Mastering? Do you need tha How about P5 Overdrive upgradeable? At UMiracle, We make them all work and work the best. Come to us, we have done the homework so you don't have to!

Multimedia Upgrades

CD-ROM/Sound Card/Multimedia add-ons:

Toshiba XM-3401B SCSI 256K Cache 200ms, 330KB/Sec, Multi-Spin/Speed Int.	$465
NEC CDR-84JD-1 Int. SCSI 280ms Multi-speed 300KB/S.	$465
Texel DM-3024N Int. SCSI 265ms Multi-Spin.	$385
DTC CD-ROM Kit with DTC 3150 SCSI Adaptor & Software.	$75
Creative Labs Multimedia Starter Kit includes: CD ROM, Sound Blaster Pro, MS BookShelf, etc.	$445
Creative Labs Discovery CD 8 Upgrade Kit.	$399
Creative Labs Discovery CD 16 Upgrade Kit.	$475
ProAudio Spectrum 16 w/ SCSI Interface.	$149
ProAudio Studio 16 w/ SCSI Interface.	$179
Creative Labs Sound Blaster Pro Deluxe.	$133
Creative Labs Sound Blaster 16 ASP.	$229
Creative Labs Video Blaster.	$328

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Components/Upgrades

Item	Price
Motherboard without CPU: (Call for CPU Prices)	
386/486 ISA 128K (25/33/50MHz-SX/DX/DX2)	$100
486 ISA VLB 256K (25/33/50MHz-SX/DX/DX2)	$130
486 AIR ISA VLB 256K 3 VLB Slots (Upto 50MHz) P24T Support, Bus-Mastering	$190
Memory Expansion Card 32MB for AIR ISA VLB	$95
486 AIR Full EISA VLB 3 VLB Slots (Upto 50MHz) Up to 256MB by 72Pin SIMM, P24T Support 8 EISA slots + 3 VLB Extensions (256/512K)	$395/$485
486 Orchid VLB SuperBoard 256K Cache Rev. C 2 VLB Slots, Bus-Mastering, Upto 50MHz	$205
486 Diamond FastBus VLB 256K Cache, Supports 72Pin SIMM w/ onboard IDE I/O, 2 VLB Slots, ZIF Socket	$255
Memory: (Call to Confirm)	
1MB RAM (256K-70ns SIMMx4)	$39
4MB RAM (1M-70ns SIMMx4)	$152
16MB RAM (4M-70ns SIMMx4)	$580
72Pin 70ns SIMM Module (4MB/8MB/16MB)	$155/305/605
I/O Card/Controller Card/Network Card:	
AT I/O 2S/1P/1G	$12
AT I/O 2S/1P/1G w/ High Speed 2 UART 16550's	$45
16Bit IDE 2FD/2HD with 2S/1P/1G	$14
IDE Caching Controller Card Upto 64MB, 2HD/4FD	$139
Promise DC-2000 VLB IDE Controller w/ I/O	$50
Orchid VLB IDE Controller w/ I/O	$65
DTC 2270VL VLB IDE w/ I/O	$80
Promise DC-4030VL VLB IDE w/ 1MB Cache	$165+39
UltraStor SCSI-2 VLB 32K Bus-Mastering 34F	$270
UltraStor 34FK including 34F + Software Driver Kit	$320
Adaptec Controller Cards	$Call
AIR Fast SCSI-2 VLB Bus-Mastering Controller	$265
AIR VLB 32Bit Ethernet Adaptor	$220
Network Ethernet NE2000 Adaptor	$85
Video Card:	
16Bit 512K/1MB Trident SVGA 1024x768	$39/59
16Bit 1MB Tseng-4000 72Hz 32K Color	$76
Tseng ET4000 VESA LB 1280x1024 16.7M Color	$115
SPiDER VLB Cirrus Logic 1MB/2MB Accelerator	$95/135
Genoa WindowsVGA 8500VL VLB 1MB	$115
Orchid Fahrenheit VLB w/1MB (Upto 50MHz) Standard/Voice Annotation	$155/200
Orchid Celsius VLB 1MB/2MB	$252/336
Diamond Speedstar Pro VLB 1MB	$120
Diamond Stealth 24 VLB 1MB DRAM S3-805	$165
Diamond Stealth Pro VLB 2MB VRAM S3-928	$360
Diamond Viper VLB 2MB VRAM 44M Winmarks	$379
AIR Star2000 VLB w/ Weitek Power 9000 2MB	$385
ATI Ultra Pro VLB 2MB VRAM 30M Winmarks	$345
Monitor:	
14" Monochrome Monitor	$90
mpression 14"1024x768x0.39DP	$205
mpression 14"1024x768x0.28DP	$255
mpression 14"1024x768NIx0.28DP	$285
KFC 14" Multisync, 1024x768NIx0.28DP, BEST BUY!! Digital-Control,Non-Glared	$363
KFC 15" Multisync,1280x1024NIx0.28DP, BEST BUY!! Digital-Control,Non-Glared,Flat-Screen	$465
KFC 17" Multisync,1280x1024NIx0.26DP, BEST BUY!!! Digital-Control,Non-Glared,Flat-Screen	$820
Sony/NEC/Viewsonic/Nanao/Mag	$Call
Modem:	
2400 Baud Send-Fax Internal + Bitfax for Windows	$31
2400 Baud with V42bis 9600 Send/Receive Fax Internal + Bitfax for Windows	$57
4.4K Baud V.32Bis V.42Bis MNP5 14.4K S/R Fax Bitfax Software Internal/External	$155/187
Floppy Drive/Tape Backup:	
Teac 1.2M 5.25"/1.44M 3.5"/2.88M 3.5"	$53/48/95
Teac Dual 1.44M & 1.2M	$135
Archive 250MB Int. TapeBackup + DC 2120 Tape	$160+20
Colorado 250MB Int. TapeBackup + DC 2120 Tape	$190+20
KeyBoard/Mice/Software/Chassis/Misc:	
01 Enhanced	$23
KeyTronic 101 Enhanced	$34
Focus 2001 101 Enhanced Click	$41
Focus 8000 111 with Calculator	$44
Focus 9000 129 Programmable with Calculator	$69
MS Compatible 3-Button Mouse	$15
Logitech First Mouse/Mouseman/Trackman	$39/49/75
True MicroSoft Serial Mouse	$49
New MicroSoft Ergonomic Serial Mouse	$65
MS DOS 6.0/Windows V3.1 Original (Registerable)	$49/59
86 CPU Cooling Fan	$20
Chassis Second Cooling Fan	$20
Standard Mini Tower	$55
Premium w/ PS Mini/Desktop/Med/Full Tower	$70/75/95/115

Add and subtract to make your dream machine!

Orchid Super VESA LocalBus Station

- ○Orchid SuperBoard 486 VLB 2 Slot 256K Cache Motherboard
- ○4MB 70ns SIMM RAM (1M-70ns SIMMx4)
- ○1.2M & 1.44M TEAC Floppy Drives
- ○213MB Western Digital Harddisk 64K Cache
- ○Orchid VESA LocalBus 32Bit IDE Controller with 2S/1P/1G
- ○Orchid Fahrenheit VLB 1MB w/ S3-805 Chipset 24Million Winmarks
- ○14" 1024X768 0.28DP Impression Monitor
- ○Premium Mini Tower 230W PS
- ○101 Enhanced Keyboard

486-33SX	$1400
486-33DX	$1503
486-50DX/2	$1630
486-50DX	$1641
486-66DX/2	$1705

Orchid's Second Generation Superboard 486 VLB, the minibaby AT-sized motherboard built with an unrivalled feature set. This unique motherboard rounds out Orchid's family of VLB products to provide complete VLB solution., including support of 50MHz on VESA LocalBus. With Orchid's new VLB IDE I/O card and Orchid Fahrenheit VLB, you simply won't find anything that's faster and more reliable. Newest design allows motherboard to support bus-mastering and guarantee running at true 50MHz. A complete VESA LocalBus solution from Orchid! Fahrenheit VLB VA with Voice Annotation capability lets you speak to your computer rather than type.All new optional upgrade Celsius VLB uses the IIT AGX015 graphics processor and high performance VRAM and cranks out 38.8 Wintach 1.2 overall RPM test, compared to 20.34 on ATI VLB Mach 32. Come by and try the difference!

Recommended Upgrades:	
Orchid Fahrenheit VLB VA/Celsius 1/2MB	add$45/175/97/181
Diamond SpeedstarPro/Stealth 24/Pro/Viper	add$-60/10/205/224
Promise 1/4/16MB Cache VLB 4030VL	add$151/264/692
Western Digital HD 250/340/420MB	add$40/110/250
UltraStor SCSI-2 VLB 34F + SCSI HD	add$Call
Premium DeskTop/Med/Full Tower	add$5/25/45
KFC 14"/15"/17" Multisync Monitor	add$108/210/565
Sony/NEC/Viewsonic/Nanao/Mag	add$Call
Mouse/DOS V6.0/Windows V3.1	add$Call

ISA VESA Local Power Station

- ○486 ISA VESA LocalBus 256K Cache Motherboard
- ○4MB 70ns SIMM RAM (1M-70ns SIMMx4)
- ○1.2M & 1.44M TEAC Floppy Drives
- ○213MB Western Digital Harddisk 64K Cache
- ○Promise DC2000 VLB 32Bit IDE Controller with I/O
- ○SPiDER VLB 1MB Windows Accelerator
- ○14" 1024X768 0.28DP Impression Monitor
- ○Premium Mini Tower 230W PS
- ○101 Enhanced Keyboard

486-33SX	$1250
486-33DX	$1353
486-50DX/2	$1480
486-66DX/2	$1555

Don't just blindly look for the lowest prices! Regular ISA system is bottle-necking with it's 8MHz AT bus. Even with a fast CPU, it's like a three hundred horse-powered YUGO, harddisk and video performances are limiting the overall performance.Think smart and get a well-balanced VESA LocalBus system for now, and for your future. Spend a little bit more, break the 8MHz AT Bus bottleneck and run the video and harddisk at the same speed that CPU is running! With this fully-tested VLB motherboard, we can guarrantee that you won't run into any incompatibility problem! And with our Promise 32Bit VLB IDE controller and 32Bit VLB video accelerator, harddisk transfer performance TRIPLES! Video runs at least (not Up to!!) TEN TIMES faster in both DOS and Windows than Regular ISA computer. Come on in and get a test-drive on this amazing machine! You have to see it to believe it!

Recommended Upgrades:	
Orchid Fahrenheit VLB STD/VA/Celsius 1/2MB	add$60/105/157/241
Diamond SpeedstarPro/Stealth 24/Pro/Viper	add$25/70/265/284
Promise 1/4/16MB Cache VLB 4030VL	add$166/279/707
Western Digital HD 250/340/420MB	add$40/110/250
UltraStor SCSI-2 VLB 34F + SCSI HD	add$Call
Premium DeskTop/Med/Full Tower	add$5/25/45
KFC 14"/15"/17" Multisync Monitor	add$108/210/565
Sony/NEC/Viewsonic/Nanao/Mag	add$Call
Mouse/DOS V6.0/Windows V3.1	add$Call

Hard Disks

Item	Price
Quantum	
240MB IDE LPS240A 256K	$270
240MB SCSI LPS240S 256K	$275
525MB IDE LPS525AT 256K	$744
525MB SCSI LPS525S 256K	$749
700MB SCSI PD700 256K 10MS	$899
1.0GB SCSI P1050 512K 10MS	$1099
1.2GB SCSI P1225 512K 10MS	$1169
Toshiba	
877MB MK438FB SCSI-2 12MS	$870
1.2GB MK538FB SCSI-2 12MS	$1020
Micropolis	
1.2GB SCSI-2 MC2112 10MS	$1089
1.7GB SCSI-2 MC2217	$1999
Western Digital	
213MB IDE WDAC2200	$220
250MB IDE WDAC2250	$260
340MB IDE WDAC2340	$330
420MB IDE WDAC2420	$470
Maxtor	
213MB IDE 7213AT 64K 15MS	$229
245MB IDE 7245AT 64K 15MS	$269
345MB IDE 7345AT 64K 14MS	$339
345MB SCSI 7345S 64K 14MS	$420
540MB IDE MXT540A 256K 8MS	$899
540MB SCSI MXT540S 256K 8MS	$859
1.2GB SCSI MXT1240S 512K 8MS	$1229
1.7GB SCSI P1-17S 256K 13MS FH	$1229

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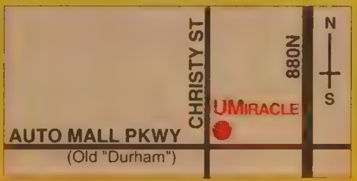

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EDITOR'S CHOICE NO.1 BYTE JUNE 1993

JUNE 1993 BYTE BEST VALUE DOS CAD SYSTEM

BEST VALUE CAD AND GRAPHICS

JUNE 1993 BYTE BEST VALUE WINDOWS SYSTEM

BEST VALUE WINDOWS SYSTEM

JUNE 1993 BYTE BEST VALUE UNIX SYSTEM

BEST VALUE UNIX SYSTEM

EDITORS & BUSINESS BUYERS AGREE!

HD IS YOUR SOLUTIONS SUPERSTORE!

BYTE'S June 1993 Best Low Cost CAD, WINDOWS, UNIX System...the HD VLB66

HD'S 486DX2/66 system won hands down for Best Low Cost CAD, WINDOWS and UNIX system. It beat out, Easterntech,Acma...... That's no surprise, considering it's solid performance, flexible expansion options and low price. Our high resolution 14" non interlaced display and Genoa WIndows VGA card featuring the Cirrus Logic chip set means faster screen redraws and more efficient work for you. All this plus one year parts & lifetime labor, lifetime tech support and optional on-site service are just a few reasons why HD's 486DX2/66 is the system for the '90s and beyond!

HD VLB 66
486DX2-66 VESA Local Bus

- ZIF Socket for Upgrade to Intel 24-T
- 8MB RAM, 256K Cache
- 1.2MB Floppy Disk Drive
- 1.44MB Floppy Disk Drive
- 340MB SCSI Hard Disk
- ULTRASTOR 34F VL-B SCSI II controller
- 2 Serial 1 parallel1 game port
- Full-tower case w /250 w Power Supply
- 14" SVGA Non-interlaced monitor 0.28 dpi
- Cirrus Logic VLB Accelerator card w/1MB (Expandable to 2 MB)
- 101 Key Enhanced Keyboard

$ 2400

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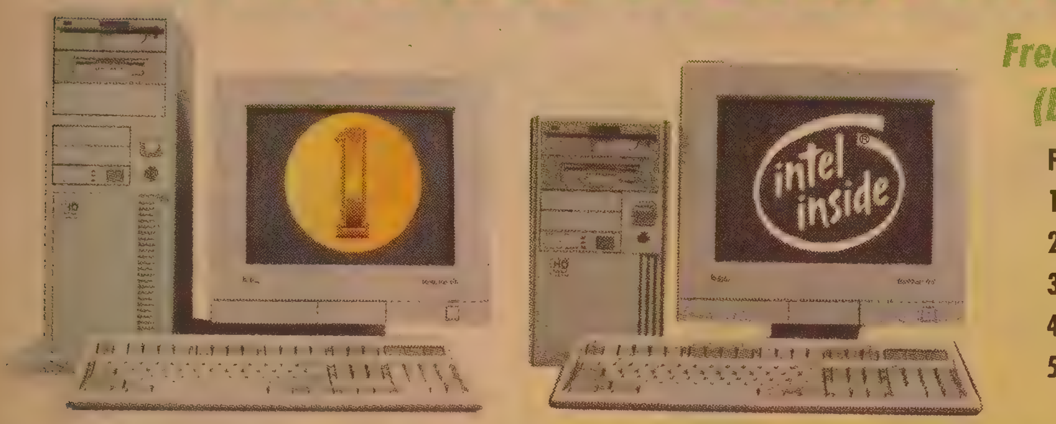

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Free Software Option:
1.PFS:Windows Works
2.PFS:Publisher
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> **" brand name components, plentiful room for expansion, ample setup options, and generous service policies are the hallmarks of this machine"**
>
> **PC Sources**

> **" definitely not another 'run of the mill' machine" "more experienced user searching for top performance might want to consider HD Computer..."**
>
> **Computer Shopper**

VESA LOCAL BUS VL-B 486SX

- ZIF Socket for Easy Upgrade to Intel 486 & P24 -T
- 128K Cache Expandable to 256KB
- 4MB RAM Expandable to 32MB
- 1.2MB and 1.44MB Floppy Disk Drive
- **130MB IDE Hard Disk**
- IDE 2H/2F Controller
- 2 Serial 1Parallel 1 Game Port
- 101-key enhanced keyboard, MITSUMI
- Mini-tower case w/ 200W power supply
- 14" SVGA Non-interlaced monitor 0.28 dpi
- **VL-B Graphic Accelerator** w/1MB (Expandable to 2MB) Max 1280x1024 16.7 Million Colors. Driver Support Windows 3.1 AutoCAD R.12 OS/2 V.2.0
- 2 button Hi-Re serial Mouse

Free Software Option

486SX-25MHz $1245
486SX-33MHz $1295

VESA LOCAL BUS BEST BUY

- ZIF Socket for Easy Upgrade to Intel 486 & P24 -T
- 128K Cache Expandable to 256KB
- 4MB RAM Expandable to 32MB
- 1.2MB and 1.44MB Floppy Disk Drive
- **245MB IDE Hard Disk, MAXTOR**
- IDE 2H/2F Controller
- 2 Serial 1Parallel 1 Game Port
- 101-key enhanced keyboard, MITSUMI
- Mini-tower case w/ 200W power supply
- 14" SVGA Non-interlaced monitor .28 dpi
- **VL-B Graphic Accelerator** w/1MB (Expandable to 2MB) Max 1280x1024 16.7 Million Colors. Driver Support Windows 3.1 AutoCAD R.12 OS/2 V.2.0
- 2 button Hi-Re serial Mouse

Free Software Option

486DX-33 $1445 486DX2-66$1645
486DX2-50 $1545

VESA LOCAL BUS PROFESSIONAL

- ZIF Socket for Easy Upgrade to Intel 486 & P24 -T
- 128K Cache Expandable to 256KB
- **8MB RAM Expandable to 32MB**
- 1.2MB and 1.44MB Floppy Disk Drive
- **340MB IDE Hard Disk**
- **32 Bit VLB IDE Controller**
- 2 Serial 1Parallel 1 Game Port
- 124-key Focus 9000 keyboard
- Mini-tower case w/ 200W power supply
- **15"** Viewsonic 15 SVGA NI monitor (1280 X 1024 0.28 dpi)
- **VL-B Graphic Accelerator** w/1MB (Expandable to 2MB) Max 1280x1024 16.7 Million Colors. Driver Support Windows 3.1 AutoCAD R.12 OS/2 V.2.0
- 2 button Hi-Re serial Mouse

Free Software Option

486DX-33 $2095 486DX2-66$2295
486DX2-50 $2195

System Below $1,000 HD 386

- 4MB RAM Expandable to 32MB
- 1.44MB Floppy Disk Drive
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- 2 Serial 1Parallel 1 Game Port
- 101-key enhanced keyboard
- Mini-tower case w/ 200W power supply
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- 16 Bit SVGA CARD/1MB
- **2 button Hi-Re serial Mouse**

386SX-33MHz $895
386DX-33MHz w/64K Cache $945
386DX-40MHz w/64K Cache $945

Windows Accelerator HD486-ISA

- 64K Cache Expandable to 256KB
- 4MB RAM Expandable to 32MB
- 1.2MB and 1.44MB Floppy Disk Drive
- **170MB IDE Hard Disk**
- 1:1 Interleave 2 FL/2HD Disk Controller
- 2 Serial 1 Parallel 1 Game Port
- 101-key enhanced keyboard, MITSUMI
- Mini-Tower Case w/ 200W Power supply
- 14" SVGA Non-Interlaced Monitor .28 dpi
- **Windows Accelerator Card w/ 1MB**
- **2 button Hi-Re serial Mouse**
- **Free Software Option**

DX2-66 $1545 DX-33 $1345
DX-50 $1445 SX-33 $1245
DX2-50 $1405 SX-25 $1195

EISA VESA

- **Nice Main Board Made in USA**
- **ZIF Socket for Upg. to any Intel 486& P24 -T**
- 256K Cache Expandable to 1MB
- 4MB RAM Expandable to 128MB
- 1.2MB and 1.44 MB Floppy Disk Drive
- **240 MB SCSI Hard Disk,QUANTUM**
- **32 BIT EISA SCSI Controller**
- 2 Serial 1 Parallel 1 Game Port
- 101-key Enhanced Keyboard,KEYTRONIC
- Mid Tower Case w/ 230W Power Supply
- **View sonic V6E Non-interlaced monitor, 28 dpi**
- **ET-4000/W32 VL-B Graphic Accelerator w/1MB** Max 1280 x1024 16.7 million colors Drivers Support Windows 3.1 Auto CAD R.12,OS/2V.2.0
- **2 button Hi-Re serial Mouse**
- **Free Software Option**

DX2-66 $2295 DX2-50 $2145
DX-50 $2195 DX-33 $2095

Top Performance HD EISA

- **Nice Main Board Made in USA**
- 256K Cache Expandable to1MB
- **8MB RAM Expandable to 128MB**
- 1.2MB and 1.44MB Floppy Disk Drive
- **525MB SCSI Hard Disk, QUANTUM**
- **32 Bit EISA SCSI Controller**
- 2 Serial 1Parallel 1 Game Port
- **124-keyFocus 9000 keyboard**
- Full-tower case w/ 250W power supply
- **View sonic V6E** Non-interlaced monitor .28 dpi
- Orchid Pro Designer IIs 32bit EISA SVGA/1MB
- **2 button Hi-Re serial Mouse**
- **Free Software Option**

486DX2-66 $3095 486DX50 $3045
486DX2-50 $2995 486DX33 $2895

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- Lotus 1-2-3 V3.1
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- Compton's MPC encyclopedia
- LOTUS 1-2-3
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HD486 ISA Multimedia

- 64K Cache Expandable to 256KB
- 4MB RAM Expandable to 32MB
- 1.44MB Floppy Disk Drive
- **CD ROM Drive**
- **130MB IDE Hard Disk**
- 1:1 Interleave 2 FL/2HD Disk Controller
- 2 Serial, 1 Parallel, 1 Game Port
- 101-key Enhanced Keyboard, MITSUMI
- Mini-Tower case w/ 200W Power supply
- 14" SVGA Non-Interlaced Monitor 0.28DPI
- **Window Accelerator Card w/1MB**
- Sound Card
- **2 Speakers & Microphone**
- **Sound Library CD-TITLE**
- **2 Button Hi-Res Serial Mouse**

486DX-33 $1595 486DX2-50 $1645
486DX-50 $1695 486DX2-66 $1795

HD486 VESA Multimedia

- 128K Cache Expandable to 256KB
- 4MB RAM Expandable to 32MB
- **1.44MB Floppy Disk Drive**
- **CD ROM Drive**
- **210MB IDE Hard Disk**
- 1:1 Interleave 2 FL/2HD Disk Controller
- 2 Serial, 1 Parallel, 1 Game Port
- 101-key Enhanced Keyboard, MITSUMI
- Mini-Tower case w/ 200W Power supply
- 14" SVGA Non-Interlaced 0.28DPI
- 32 BIT-VLB Graphic Accelerator
- Sound Card
- **2 Speakers & Microphone**
- **Sound Library CD-TITLE**
- **2 Button Hi-Res Serial Mouse**

486DX-33$1695 486DX2-50 $1745
486DX2-66 $1895

HD486 EISA VESA Multimedia

- 256K Cache Expandable to 512KB
- 8MB RAM Expandable to 32MB
- 1.44MB Floppy Disk Drive
- **TOSHIBA CD ROM Drive SCSI**
- **245MB SCSI Hard Disk, MAXTOR**
- 32Bit EISA SCSI Controller
- 2 Serial, 1 Parallel, 1 Game Port
- 101-key Enhanced Keyboard, MITSUMI
- Mid-Tower case w/ 230W Power supply
- 14" VIEWSONIC 6E SVGA NI 0.28 DPI
- ET-4000/w32 VLB w/1MB
- **Pro Audio Spectrum 16**
- **Toolworks Encyclopedia**
- **CARMEN San Diego**
- **2 Button Hi-Res Serial Mouse**

486DX-33$2845 386DX2-50 $2945
486DX2-66$3045

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MITSUMI (INT) W/16bit card MPC/ 350MS		$195
TOSHIBA XM-3401B/SCSI	(INT)	$465
	(EXT)	$575
SONY 31A/controller card		$215
SONY 541 SCSI	(INT)	$385
TEXEL/SCSI MD-3024/265MS w/caddy	(INT)	$355

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SOUND BLASTER PRO	$169
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PRO Audio Spectrum 16	$169
SOUND BLASTER compatible/ microphone, speaker	$89
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Enterprise III EISA/VL-B 486DX-33/256K/CPU	$1150
Super Voyager 486DX2-66/VL-B/256K/CPU	$1200
Super Voyager 486DX33/VL-B/256K/CPU	$995
	$995
MICRONICS	
486DX-33/256K/CPU ISA	$690
486DX-50/256K/CPU ISA	$990
486DX2-66/256K/CPU ISA	Call
NX-30 486DX-33/256K/CPU VL-B	$850
NX-30 486DX2-50/256K/CPU VL-B	$950
NX-30 486DX2-66/256K/CPU VL-B	$1190
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ZIF EISA VESA ~~VL-B 486~~DX/256K	$300
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EISA 486DX/256K/8 EISA slots	$400
ORCHID	
486DX33/DX2 50/DX2 66/256K VL-B	$350
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Orchid Fahrenheit 1280/1MB	$165
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Orchid Pro Designer IIs/1MB	$135
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Orchid Fahrenheit VL-B/1MB	$210
Orchid P9000/3MB	$475
Cirrus Logic VL-B Graphic Accelerator/1MB	$135
Cirrus Logic VI-B Graphic Accelerator/2MB	$165
ET-4000/w32 Graphic Accelerator/1MB	$175
Windows Accelerator Card/1MB	$85
16-bit SVGA Card/1MB	$80
16-bit SVGA card/512K	$65
16-bit SVGA card/256K	$50
M.G.P. card	$20
Modems	
Zoltrix 2400 Modem	$45
Zoltrix 9600/2400 Fax Modem	$75
Zoltrix 9600/2400 Fax Modem for Windows	$95
Zoltrix 14400/14400 Fax Modem	$195
Zoltrix 14400/14400 Fax Modem for Windows	$215
Intel Satisfaction 200 96/24 Fax Modem	$315
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14" VGA Mono Monitor	$120
14" VGA Monitor .39 dpi (1024x768)	$225
14' SVGA Monitor .28 dpi (1024x768)	$275
14" SVGA non-interlaced monitor .28 (1024x768)	$295
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MX145 14" 1280x1024 .26 NI	$525
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MX17F 17" Flat 1280x1024 .28 Ni	call
VIEWSONIC	
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Viewsonic 15 15" 1280x1024.28 NI	$595
Viewsonic 7 17" 1280x1024.28 NI	call
Viewsonic 17 17" 1600x1280.28NI	call
Viewsonic 8 20" 1280x1024.31 NI	call
Viewsonic 20 20" 1600x1280.28 NI	call
Viewsonic 21 21" 1600x1280.28NI	call
SONY	
1430S 14" 1024x768.25 NI	$645
1604S 17" 1024x768.25 NI	call
2036S 20" 1280x1024.30 NI	call
NEC	
3 FGE 15" 1024x768.28	call
4FGE 15" Flat 1024x768.28 NI	call
5FG 17" Flat 1280x1024.28 NI	call
6FG 21"Flat 1280x1024.28	call
NANAO	
F550i 17" 1280x1024.28 NI	call
F660i 20" 1280x1024 .31 NI	call
F750i 21" 1280x1024.31 NI	call
Keyboards	
(On - screen reprogramming)	
Programmable Keyboards	$99
Programmable Keyboards black	$109
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Omni Ultra	$95
Omni 102	$79
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Educational		
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EDU004	Dictionary of Living World	$24.95
EDU005	Family Education Collection	$29.99
EDU006	Mixed-up Mother Goose MPC, DOS	$24.99
EDU007	PC Graphic & Sound Demo	$23.99
EDU008	Playing w/ Language - English	$34.99
EDU009	Playing w/ Language - French	$34.99
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REF011	PC-SIG 11th Edition	$23.99
REF012	Mavis Teaches Typing MPC	$29.99
REF013	Microsoft Bookshelf	$69.99
REF014	Microsoft Works mpc	$69.99
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ENT033	Space Quest IV: Roger Wilco	$29.99
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TRV002	Great Cities - Vol 2	$24.95
TRV003	National Geographic Mammals	$34.99
TRV004	US Atlas/World Atlas	$29.99
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TRV006	World Atlas MPC	$29.99
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2530 WATT AVE., SACRAMENTO, CA 95821

Calendar Of Events continued

August 23 PageMaker II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 23–24 Local Area Networks: LANtastic To Novell Seminar. Oakland. Excel Micro Solutions. Call: (510)836-2040.

August 23–26 Novell System Administrator 3.11 Class. Oakland. California Computer Options. Call: (510)444-5700.

August 24 Intro To Local Area Networks Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 24–27 Intermediate AutoCAD Workshop. Santa Clara. The Cooper Connection. Call: (408)970-9838.

August 24–27 Intro To AutoCAD Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

August 24–September 14 MacroMedia Director Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 25 Increasing Productivity With Multimedia Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 25 Intro To UNIX Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 25–26 Supporting & Troubleshooting Windows 3.1 Seminar. San Francisco. Data-Tech Institute. Call: (201)478-5400.

August 26 Intro To Windows 3.1 Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 26 Networking For Small Offices Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 27 Windows For Workgroups Class. Emeryville. Informational Data Networks. Call: 1-800-696-5267.

August 28 A Beginners Guide To Telecommunications On The Mac Course. San Francisco. Media Alliance. Call: (415)771-7133.

August 28 Networking For Legal Professionals Seminar. San Francisco. Network Services Group. Call: 1-800-998-3540.

August 28 Overview Of The Telecommunications Industry Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

August 29 Mac Basics Level II Class. San Francisco. Media Alliance. Call: (415)771-7133.

August 29–30 Learning Technologies For Educators—Workshops For Educators In Writing, Foreign Languages, Or Physics. Berkeley. Instructional Technology Program, UC Berkeley. Call: (510)642-1668. Email: ipt@garnet.berkeley.edu.

August 30 Beginning PowerPoint Class. Oakland. California Computer Options. Call: (510)444-5700.

August 30–31 Asymetrix Toolbox For Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

August 30–31 3D Microstation Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

August 30–December 22 Intro To UNIX With Solaris 2.0 Course. Oakland. Laney College. Call: (510)834-5740.

August 31 Microstation Training Information Session Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

August 31–September 3 Advanced AutoCAD Workshop. Santa Clara. The Cooper Connection. Call: (408)970-9838.

SEPTEMBER

September 1 Microsoft Information Session Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 1 Microsoft Publisher And Word For Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 1 Multimedia Information Session Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 1–3 Update From AutoCAD Release 10 To 12 Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

September 2 Intro To Networks Class. Oakland. California Computer Options. Call: (510)444-5700.

September 2 Intro To Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 3 Beginning DOS Class. Oakland. California Computer Options. Call: (510)444-5700.

September 3 Intermediate Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 7 Beginning Windows Class. Oakland. California Computer Options. Call: (510)444-5700.

September 7–9 Intro To Word For Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 7–9 Telecommunications: Techniques And Technologies Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 7–10 2D Microstation Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

September 7–October 26 Writing For Multimedia: New Horizons For Writers Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 8 Intermediate Word For Windows Class. Oakland. California Computer Options. Call: (510)444-5700.

September 8–October 27 Building A Multimedia Business: Developing A Business Plan And Getting Started Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 9–10 Microsoft Publisher Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 9–October 21 Graphic Design For Multimedia On The Mac Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 10–11 How To Install, Grow, And Maintain A Project Management Culture Seminar. Santa Clara. UC Extension. Call: (408)427-6636.

September 11 Overview Of Multimedia Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 11 Telecommunications: Techniques And Technologies Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 11–25 Getting Started With MacroMind Director Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 12 Overview Of Multimedia Authoring Software Class. San Francisco. SFSU

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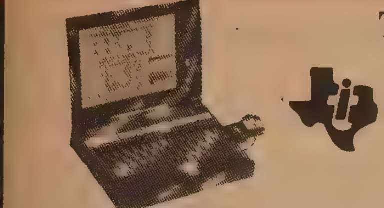

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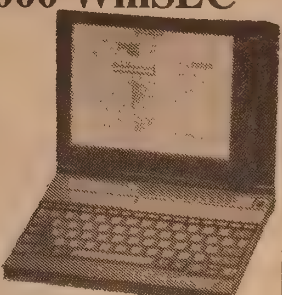

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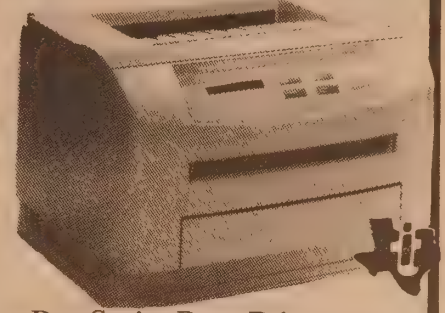

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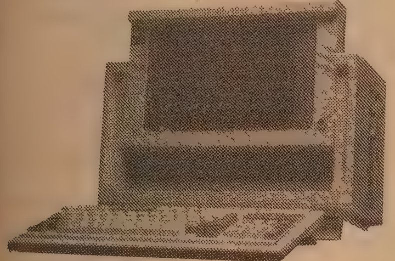

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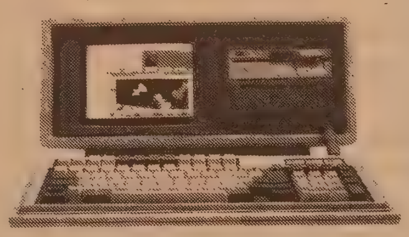

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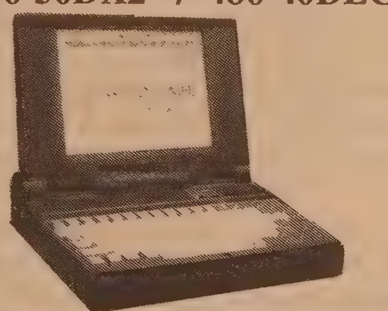

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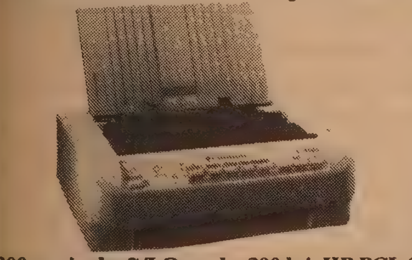

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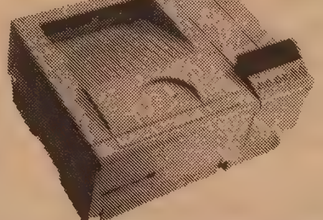

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Diamond Stealthpro 1MB VESA	$289
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IBM Inkjet Printer 4070	$429
IBM Laser Printer 4019 5PPm	$849
IBM Laser Printer 4029 6PPm	$999
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MultiMedia Upgrade Kit (Ext.)	$519
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Extended Education. Call: (415)904-7700.

September 13 Beginning Excel Class. Oakland. California Computer Options. Call: (510)444-5700.

September 13–14 Asymetrix Toolbox For Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 13–20 Intro To The PC For CAD Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

September 14–16 Intermediate Word For Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 14–17 Intro To AutoCAD For Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

September 14–21 Intro To Data Communications Networks Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 15 Intermediate WordPerfect 5.1 Class. Oakland. California Computer Options. Call: (510)444-5700.

September 15 Is AutoCAD For Windows Rel. 21 For Me? Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

September 15–16 An Introduction To Networking PCs With Novell Seminar. San Francisco. Center for Advanced Professional Development. Call: (714)261-0240.

September 15–November 3 Intro To Applied Multimedia Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 16–November 18 Intermediate Interface Design: Designing Original Interfaces For Multimedia Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 17 Advanced Windows Class. Oakland. California Computer Options. Call: (510)444-5700.

September 18 Careers In Multimedia Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 20 QuickMail Administrator Level I Course. Berkeley. Network Frontiers. Call: (415)644-9400.

September 20–22 Novell Advanced System Administrator 3.11 Class. Oakland. California Computer Options. Call: (510)444-5700.

September 21 QuickMail Administrator Level 2 Course. Berkeley. Network Frontiers. Call: (415)644-9400.

September 21–23 Word For Windows Style Templates And Macros Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

September 21–24 Intermediate AutoCAD Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

September 22 Managing AppleShare Course. Berkeley. Network Frontiers. Call: (415)644-9400.

September 23 Backup Management Course. Berkeley. Network Frontiers. Call: (415)644-9400.

September 23 Intermediate Excel Class. Oakland. California Computer Options. Call: (510)444-5700.

September 27 Beginning Lotus Class. Oakland. California Computer Options. Call: (510)444-5700.

September 28 Intermediate Lotus Class. Oakland. California Computer Options. Call: (510)444-5700.

September 28–October 1 Intro To AutoCAD For DOS Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

OCTOBER

October 1 Microsoft Access And FoxPro For Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

October 5–8 Customizing AutoCAD Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

October 6–8 FoxPro For Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

October 9–10 Intro To The PC For CAD Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

October 12–13 Intro To Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

October 13 AutoCAD Information Session Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

October 14–15 Intermediate Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

October 15–29 Access For Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7700.

October 16–17 Intro To AutoCAD For Windows Class. San Francisco. SFSU Extended Education. Call: (415)904-7737 or 904-7738.

October 25–26 Adobe Photoshop 2.5 Workshop. Sacramento. Graphic Communications Assoc. Call: (703)519-8160.

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and some enclosures can be "viewed" without having to download them first. Text files can be opened, pictures can be shown, and sounds played, by Option+double-clicking on the file enclosure.

The best thing about the Planet BMUG system has been the expansion of our online community. We're trying to bring people together, especially new users and groups that have been ignored by the usual nerd services. For example there's the Bay Area Mac Women's support group, and special connections to bulletin boards in Japan and France for some of our foreign members. The Planet also shares many message conferences with our affiliate group BMUG Boston's BBS.

There are many technology conferences on the BBS, as you might imagine, covering every facet of computer life, from the beginning user to the advanced programmer. The Special Interest Groups (SIGs) that meet at BMUG have folders, but there are also more than two dozen of the very popular Internet Macintosh groups.

But BMUGers are interested in many things, not just Macintosh. We have scads of conferences, covering almost everything under the sun. If you're a gardener or sci-fi addict, you can connect with another BMUGer with your interests. There are active conferences of Bay Area restaurant reviews, sports, and travel tips. Teens are not excluded, and there's the intriguing Weirdness in the Bay Area group. Boy does that cover a lot of territory!

All BMUG members receive a copy of the Planet software when they become members. I hope you will join us in our combined virtual and physical world community. See you online!

BYTES AND PIECES

- Congratulations Michele Carpender of the BMUG Office staff, and David Schwartz, BMUG Board member, on the birth of their son, Eli Meyer. David uploaded a digitized color picture of the latest BMUG baby to the Planet for everyone to admire a day after the blessed event.
- If you have a need to directly connect to the Internet, The World, a commercial Internet provider running on a UNIX host is offering a special rate for BMUG members. You get a couple of hours free (the details are on the Planet), and have access to all Internet Services including: Mail, Telnet, FTP, the entire collection of Newsgroups (there are thousands), Gopher, Archie, and the list goes on. ■

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	w/128K	775	945
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	w/128K	650	820
ISA			
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	w/128K	658	828
486DX-50 (3 Slots Local Bus)	w/256K	603	773
	w/128K	583	753
486DX-33 (3 Slots Local Bus)	w/256K	478	648
	w/128K	458	628
486DX2-66 (2 Slots Local Bus)	w/256K	598	768

SYSTEM		MB +CPU	BASIC SYSTEM
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486DX-33 (2 Slots Local Bus)	w/256K	398	568
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486SLC V-25/50	w/387-25	303	473
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386-33	w/128K	131	301
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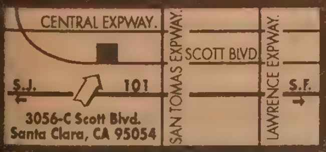

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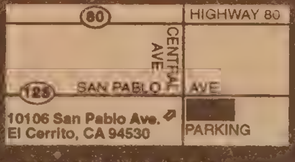

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What Is BMUG?

BMUG is an educational nonprofit consumer advocacy group organized to share information, and provide critical direction to users and developers in the computer community worldwide. It is an independent advocate, not affiliated with any manufacturer, delivering trustworthy information and useful products.

Like any growing organization, it is many different things to its 14,000 international members. BMUG supports many Special Interest Groups (SIGs), an 18-line Bulletin Board System (BBS), free HelpLine, software library, weekly meetings, publications, and much more. BMUG also puts out a semi-annual 350+ page book that we call our "newsletter." Our motto continues to be: *We're in the business of giving away information.*

Come and join in the dialogue at the BMUG main meeting every Thursday evening, 6:30 to 9:30 (or whenever we finish), on the UCcampus. BMUG West and BMUG South are monthly meetings held in San Francisco and San Jose.

The BMUG Office, 2055 Center Street (a half block from the BART Station) is open to the public from 9 am to 5 pm. Please come by and say hello, meet other members, and hang out.

The BMUG Helpline provides volunteer technical assistance and telephonic hand-holding for our members. If your question can't be answered on the spot, we try get you in touch with someone that can help. Of course, not every problem can have a happy ending—but we try. Improve your Macintosh education, and help others by becoming a Helpline volunteer!

BMUG has one of the most up-to-date, comprehensive software libraries around with hundreds of disks filled with the latest versions of public domain or shareware programs, and HyperCard stacks. New disks are unveiled almost every week at the Thursday general meeting. BMUG also brings you the *TV-ROM*™, a fantastic collection of public domain QuickTime videos.

Our new graphic user interface FirstClass 18-line BBS offers many of the latest versions of files in our software library as well as news, private mail, rumors, etc. With our multi-line capability, you can have access to BMUG almost 24-hours a day. It's easy to use, fun, and a great resource.

BMUG can be found on most electronic services. BMUG can also be reached through the Internet international network through UG0001@applelink.apple.com.

To get some further information about BMUG please write to: BMUG, 1442A Walnut Street #62, Berkeley, CA 94709. If you prefer to phone our business office call (510) 549-BMUG, or FAX (510) 849-9026.

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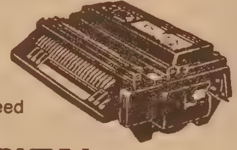

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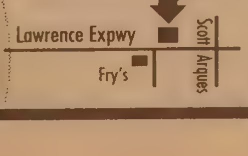

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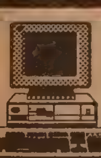

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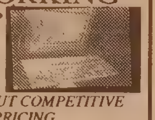

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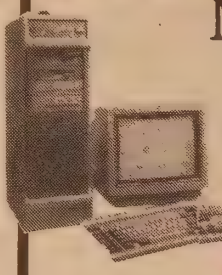

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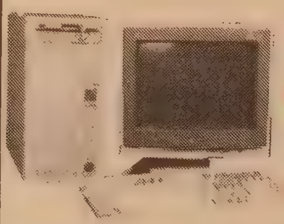

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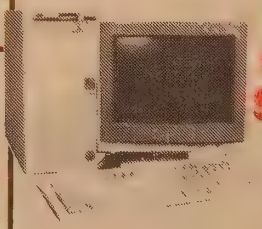

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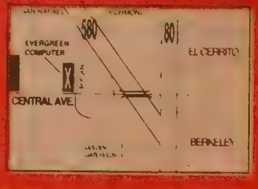

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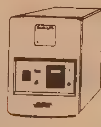

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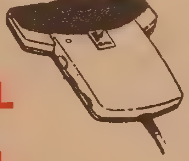

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continued from page 196

In contrast to the single-purpose Viking Express, however, the portable computer, modem, and cellular phone are available for conventional uses, so the basic wireless add-on cost is just $299 for the adapter. It operates like an ordinary modem: users dial up their Internet or other service's access number on the cellular phone and then proceed as usual. The sender is reached at a mobile phone number, separate from one's ordinary number. With suitable software, faxes can also be sent and received.

In conjunction with the ComputerWare Macintosh retail chain, PacTel just began demonstrations of this technology at ComputerWare stores in San Francisco, San Rafael, Dublin, and Sunnyvale. The demonstrations will continue through September 1. I checked out the system at the Dublin store, where assistance was eager, enthusiastic, and well informed.

PRICEY WIRELESS

Before you decide to dedicate yourself wholly to wireless data transmission, however, you should remember that wireless is new and requires heavy capital costs. Furthermore, transmitting through the air is inherently more vexatious and complicated than transmitting over wires.

No communications medium runs at its rated speed, but the disparity is especially great for wireless. The PacTel system is rated at 9600 bits per second but would be lucky to operate at a relatively low percentage of that number. Viking Express sends packets very deliberately, one after another, and is even slower. Higher speeds will be achieved in the future, but the bandwidth of any wireless system is limited by the share of a very crowded spectrum allocated to it by regulators. This places a ceiling on wireless transmission that is vastly slower than the gigabit per second speeds that lie just beyond the immediate horizon for the Internet. For all these reasons, wireless transmission charges are higher—much higher—than conventional communications.

Operating charges of the two systems recently evaluated are not easy to compare, because both systems offer various options based upon frequency of use. The PacTel basic plan is around $40 per month. Data and voice are both charged at the same rate, by the minute: 45 cents during peak hours, 20 cents off-peak.

In keeping with cellular practice, incoming and outgoing messages are charged at the same rate. A colleague who decides to send you the latest draft of his 47-page paper for the upcoming holography seminar can inadvertently footnote it with an intimidating bill from the your cellular company. The moral: Be cautious about leaving your cellular phone turned on, and be very cautious about giving out your mobile phone number.

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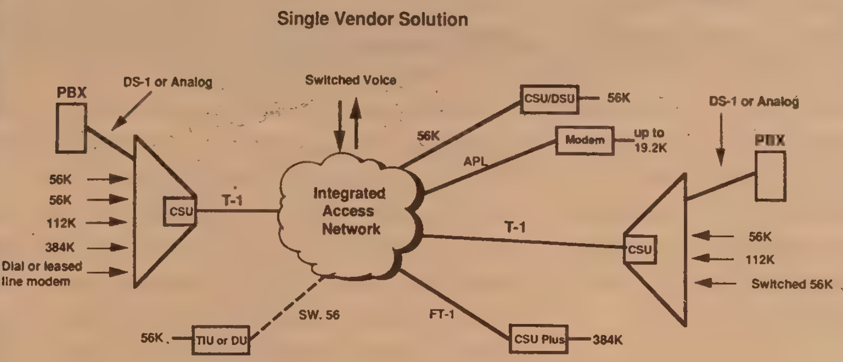

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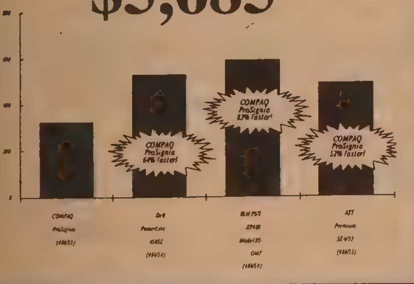

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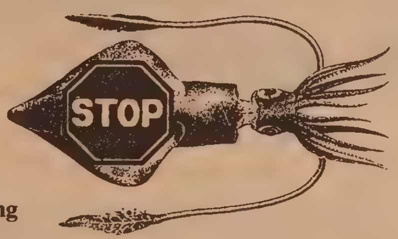

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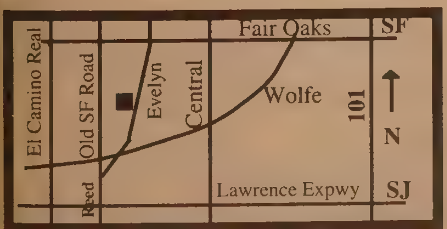

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The Viking Express/RAM Mobile/RadioMail combination was originally designed for relatively brief messages: sales orders, requests for spare parts, delivery notices, emergency messages, and so on. The monthly base charge is about twice the PacTel basic rate. Per-message charges are based upon the number of packets sent and can mount up quickly. The system is not really designed for long documents, which in any event would be expensive to send.

COVERAGE, HAND-OFF, ROAMING

Both strategies rely upon a number of relatively small base stations, placed in order to achieve optimum coverage at acceptable cost. When the wireless modem or cellular phone is turned on, it sniffs around to locate the transmitter that provides the best signal. Then it locks on. If a transmitter/receiver is moving from one zone of coverage into another, it is "handed off" from one antenna to the next. This involves a brief break in continuity that may seem like a cough in voice communication but could skip key words or numbers in data transmission.

This is a subject of intense debate between radio and cellular advocates. The radio people note that their larger coverage zones reduce handoff. (And, with the current Viking Express, packets move so slowly that the chance of significant loss is reduced.) Cellular zealots say that their larger numbers of base stations saturate the region more effectively.

Both systems provide a system of indicators on a display that shows local signal strength and notes whether contact has been established. I ran tests with the Viking Express in a car, houses, and buildings around the main basin of San Francisco Bay and in eastern Alameda County. All messages got through, except for one sent from the middle of Niles Canyon.

As would be expected, indicated signal strength was greater in Fremont or Mountain View than in the lee of the Pleasanton Ridge. This caused no problems, however. There was no opportunity to do similar tests with the PacTel system, but earlier experience with cellular voice phones suggests that coverage would be about the same.

As for the handoff issue, advocates of both systems suggest, when pressed, that for data transmission it is probably best to sit still while the message goes out.

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RadioMail will respond to a message from a Viking Express system anywhere within RAM Mobile's extensive and growing areas of coverage. For a cellular-based system, a procedure called "roaming" permits use as the customer moves from the territory of one cellular company into the fief of another. Cellular advocates note that total geographical coverage, while far from universal, is currently more complete than radio coverage.

FUTURE

Viking Express/Mobitex and the PacTel package are not alone in the wireless business, which is growing more crowded every week. A similar wireless modem, the Motorola NewsStream, is to be used to link Motorola's EMBARC transmission system (similar in function to the RAM Mobile-RadioNews combination) with HP's latest palmtop, the 100LX. EMBARC reports coverage in 220 cities in the US and Canada. Similar EMBARC service will be extended to the Tandy/Casio Zoomer, due for shipment in October, which features pen commands and a virtual keyboard that appears on the screen to be pecked at with a stylus. RadioMail now also offers service for Apple PowerBooks via the Ericsson/GE Mobidem or the new Motorola InfoTAC pocket wireless modem.

Skytel, which like Motorola has arrived in wireless data transmission via a background in paging, is introducing similar products. Another radio system, ARDIS, is also expanding its geographical coverage and is introducing an improved portable terminal using the Motorola modem.

Motorola has just announced a wireless modem that will,when available for shipment sometime early next year, fit into the PCMCIA standardized card slots now becoming the norm on sublaptops and some new PCs. This product should lay the technological base for wireless use of devices intended for the third stage of the wireless market: "Do I really need this?" buyers. The Tandy/Casio Zoomer, and in some respects the new HP OmniBook, are on the edge of this stage.

The EO system, now owned by AT&T, and Apple's much-delayed Newton should represent the mainstream of this expected trend, described variously as the Personal Digital Assistant or substitute butler/secretary/eternal mama.

Unless Motorola really takes the plunge immediately into mass-market pricing, however, the new PCMCIA modem will be too costly for under-$1,000 products.

And, meanwhile, the radio faction and the cellular crowd will continue to battle for market share. With luck, this should drive down the charges for services. ■

continued from page 158

ket—IDE is the most popular, followed by SCSI. (The older MFM/RLL and ESDI interfaces are not commonly included these days in new systems.) The advantage of the IDE interface is that it tends to be the easiest to install and the most hardware-compatible with Windows. The advantage of the SCSI interface is that it supports larger drives at lower prices than IDE.

You should be careful when considering SCSI for a Windows system. Windows multitasks and runs large single applications swapping program code between onboard memory and a storage file on disk. Some SCSI drive controllers are incompatible with Windows' high-speed swapping feature.

Because the disk swapfile is an integral part of the way Windows works, the faster your hard disk, the better. Hard disk statistics you should be aware of include the average time performing random disk reads and the disk's data transfer rate. Currently, a random seek rating (the time it takes the disk to find a piece of data on the drive) of six to eighteen nanoseconds is considered good for a new IDE hard drive. Data transfer rates for current hard disks may vary from 500 to 2000KB per second.

You may want to take individual benchmark surveys with a grain of salt, although a company that consistently earns good marks is probably worth investigating.

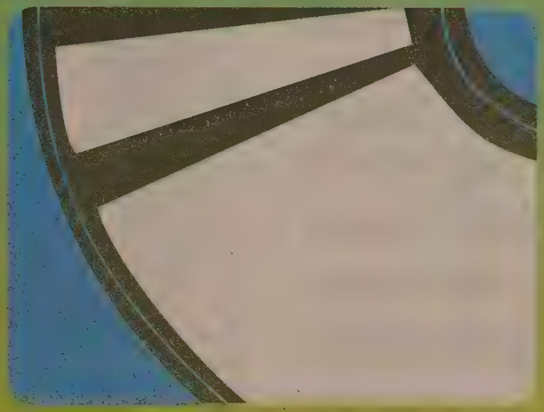
A good graphics card can noticeably affect your subjective comfort in Windows applications. Of current graphics card vendors, ATI, Orchid, and Diamond Speedstar all offer high performance. These high-end manufacturers support a special PC feature called local bus graphics. Ordinarily, your PC processes graphic information at the speed of the system bus (typically 8–10 MHz). A local bus installed in the machine permits graphic information to be transmitted at the speed of the CPU (16–32MHz). Since local bus graphics is a relatively new PC feature, the standards for implementing it are not yet firm. Leading graphic card manufacturers have supported an organization called VESA, which has provided specifications for the local bus. Many computer manufacturers have begun to comply with the VESA standard, although some still offer independent implementations.

In addition to supporting the VL VESA local bus, your graphics card may also contain a special Windows accelerator chip. Some graphics companies include a special coprocessor on the card to speed up performance. When you go to purchase a new 486 system, you may want to ask what kind of graphics card has been installed in the system. Computer magazines frequently review system performance and provide benchmark results that may help you to determine whether the graphics card installed in your prospective system offers good performance. One flaw in this system is that some companies have been known to cheat the benchmark by deliberately tweaking code to provide high results on benchmarks not mirrored by actual application performance. You may want to take individual benchmark surveys with a grain of salt, although a company that consistently earns good marks is probably worth investigating.

In the last analysis, probably the best way to determine whether a specific computer is suitable as your Windows machine is to audition the computer. Find a dealer who'll let you spend some time with a machine that's well stocked with Windows applications. Try opening documents, typing, drawing, or manipulating a spreadsheet.

If you aren't certain whether the performance is brisk enough for you, you may take into account some of the component and CPU issues discussed in this review. You can ask whether the vendor offers a higher grade video card, or stocks a machine with "local bus" or high-speed CPU. You should then reaudition Windows until you're satisfied that you can work with it comfortably. (If you have the time and energy to invest, there are software improvements that also improve Windows' performance, but that topic is best left for another article.) ■

Multi Media & beyond



D'Cückoo;
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Musicians, Artists, And Programmers Join Forces To Create Unique Concert Experience

MULTIMEDIA 101

Photos: Susana Millman

D'Cückoo: Multimedia & Interactivity In Pop Music

BY JONATHAN E.

Pop music has long been an incubator for traditional expressions of multimedia—the light shows and posters of the Fillmore era, melding music with visual art forms; The Who's "Tommy," a successful rock opera on Broadway twenty-five years after its original incarnation. The Residents and Gwar are latter-day examples of the long evolution of theatrical rock. Digital technology offers the possibility of dramatically expanding upon these historic efforts to produce a new and more integrated generation of music-inspired multimedia—especially in the live-performance arena.

A limited degree of interactivity has been inherent in music performance over the years. Musicians interact at one level as they play rehearsed and composed pieces; when jamming, they move to a different level. Between-song banter is a form of interaction with the audience, and performers and audience often create a feedback loop that can either elevate or depress performance levels.

Aside from clapping in time, though, the audience's input into musical performance barely dents the barrier between performers and audience. Once again, digital technology stands to revolutionize the current status quo, making musical performance into something more like a group collabo-

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Jonathan E. has worked with desktop multimedia since 1988. He also writes about world music and the Archaic Revival for BAM. *His USPS mailing address is c/o SoundSwell, 54 29th St., Richmond, CA 94804. His email address is jeve@well.sf.ca.us*

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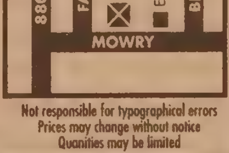

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ration between band and audience in a nonhierarchical MUD-like sense.

The emergence of better tools for multimedia and interactivity raises many questions: the nature of creating art, the relationship of one medium to another, the techniques of collaboration and improvisation, the amount of control required to maintain artistic focus, the marketing of recorded results to a wider audience. Like the last century's wagon-train travelers, pioneers in this field are discovering that the journey requires substantial amounts of vision, tool-making and repairing, as well as detours, backtracking, and an eye for the weather.

Thankfully, in contrast to the Old West, this is virgin territory; attacks from the indigenous residents need not be feared. On the other hand, the entertainment industry has a certain infrastructure, which displays some passive resistance or inertia to the changes needed to realize these visions of the future.

Tina "Bean" Blaine of D'Cückoo:
"We're greatly influenced by going to places like Africa where everyone is a musician, whether they're playing an instrument or not. Everyone is a part of whatever the festival or celebration is, and that kind of spirit is what we're trying to create in our shows."

D'CÜCKOO AND SOUND

D'Cückoo is a Bay Area band whose goal, says founding member Tina "Bean" Blaine, is "to involve people in what's happening. We're greatly influenced by going to places like Africa where everyone is a musician, whether they're playing an instrument or not. Everyone is a part of whatever the festival or celebration is, and that kind of spirit is what we're trying to create in our shows."

On stage, D'Cückoo consists of five female musicians: two founding members, Blaine and Candice Pacheco; plus keyboardist, bassist, and electronics wizard Jennifer Hruska; percussionist Debbie Lane; and vocalist Tracy Blackman. Pacheco plays synth guitar and keyboards, and teams up with Blaine and the other band members on D'Cückoo's genuinely original and self-built turtle drums (looking a little like kettle drums) and marimbas. Unlike their acoustic, analog cousins, these instruments are electronic, used to trigger MIDI signals and samples.

Blaine remembers that when she returned to the States in the '80s, after studying music and dance while traveling in Africa and Asia, she was suffering from "massive culture shock" when she saw Mapenzi, a marimba-based world beat band in San Francisco. "Lights went off in my head. It was 'I want to learn how to play this instrument.' I hadn't played marimbas before; I was a percussionist and a keyboardist. For me, marimbas were the perfect synthesis of bringing together a melodic instrument with percussion. I knew Candice from dance classes and Patti Clemens, the other founding member, so we all got together and built seven marimbas. We thought it would be cool to build instruments that could sound like those, but could also sound like anything at all."

Pacheco adds, "There were no blueprints. None of us had a hardware background. Bean had a little bit of engineering experience from college. I did software and I studied electronic music. Basically when I was in school I studied ethnic music, or global music, and electronic music, so that's sort of been my synthesis for a long time. We just embarked on this odyssey of figuring out how to do that."

The original hand-wrapped boards still hang on their studio wall, and Blaine laughs that, "Any real engineer would run screaming from the room if they looked at our wire-wrapping job—but they work."

The band makes all its own samples except for a very few taken from the Poke in the Ear library. In performance, they use no desktop or PC level technology. For recording, they use a Mac IIci with OSC's DECK program, which records direct to hard disk with multitracking abilities.

Musically, D'Cückoo are extremely varied, at times sounding funky, spacey, orchestrally rocky, or purely percussively propulsive. Influences range from the Shona music of Zimbabwe and the taiko drumming of Japan to the harmonic throat music of the Tuvans and Middle Eastern vocals.

Visually, the band is striking, especially when all five players are lined up on the marimbas or turtle drums, arms flying in unison with fluorescent sticks pounding out the beat. Blaine points out, "We love the really big physical playing style and the fast interlocking rhythmic parts that are what that [Shona marimba] music is about. However, there's a lot of harmonic stuff going on too. People think of marim-

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bas as percussion instruments—I guess they are—but most of what we're playing on them is melodic and harmonic parts." Pacheco adds, "We also texturally layer different sounds so that you're not hearing a strict marimba sound. There's a lot of other things that are happening timbrally to create layers and effects that we like to do, so there's transitions in the music and things build and gather more excitement."

D'CÜCKOO AND VISUAL MULTIMEDIA

While the music is primary, D'Cückoo place great emphasis on the visual multimedia aspects of their performances. Again, their goal is to increase the involvement of others, both the audience and their visual collaborators, in the experience of the performance.

D'Cückoo's three main visual collaborators are Maggie Hoppe, who runs videotapes, operates the video switcher, and provides general graphic design; Ron Fischer, who produces the SGI Indigo computer graphics; and Phyllis Laurie, who projects slides. However, as Fischer points out, they're only the tip of the iceberg because they use the work of about thirty other video and film producers and computer graphics programmers.

> **While songs, videotapes, and Indigo programs have been matched up by a process of experimentation to discover combinations that work, in performance each show is different. Maggie Hoppe, who runs the videotapes, explains, "Like jamming, it's not carefully choreographed."**

Besides the slides, the visuals come from two sources: videotapes and the Indigos. Basically, the Indigos are running 3-D modelling demos. These are individual programs of between five thousand and forty thousand lines of code each, written by programmers including Angus Henderson, David Maynard, Chris Perry, Gavin Bell, Dave Tristram, and Fischer himself. In most cases, Fischer has modified the programs to maximize his control.

Different programs are used for different songs. Using a QWERTY keyboard, a mouse, and a SpaceBall from Spatial Systems, Fischer controls various parameters such as color, the number and speed of objects, and the viewing angle, all in real time. These programs are fun—but not easy—to play with. Different programs use different combinations of keystrokes and he notes that with "some programs I'm more like a conductor in a symphony, and with some I'm more like a performer." Some effects in a few programs can be triggered by MIDI signals, or by the amplitude or frequency of the sounds; this is an area of interactivity that is still being explored but offers much for the future.

The videotapes come from several artists and were produced with various techniques. Mark Winkler's "Clown Head," used while the MIDIBall is in action, is the only one produced entirely on a Mac; it was done in Swivel 3D. Susan Scott's "Falderal," featuring bouncy baby dolls, was done with stop-frame animation, while Hoppe's "Big Boys" uses real footage taken from satellite feeds during the Gulf War with 2-D animation and a lot of post-production. "Big Boys" was the only video made specifically for D'Cückoo. Other videos are basically ambient and abstract.

Phyllis Laurie works fairly closely with the band to coordinate her slide images with the band's song material and is considered as important a contributor as Fischer and Hoppe; her effect is more subtle because the images are static. She usually runs two or three slide projectors at a time to blend images.

While songs, videotapes, and Indigo programs have been matched up by a process of experimentation to discover combinations that work, in performance each show is different. Hoppe explains, "like jamming or composition to music, it's not carefully choreographed." Actual rehearsal time between the visuals and the music is extremely limited, mostly occurring at soundchecks, although Fischer practices his parameter control using tapes of previous performances. He loads the appropriate program at the beginning of each song, while Hoppe has each video precued on its own tape and inserts it into the tape deck to begin playback. As the band plays, Fischer coordinates the parameters of the program and Hoppe, at the switcher, spontaneously mixes the tape with his program output. Depending on the setup of the particular venue, she may be able to see what he has on screen or they may communicate through headsets. Every so often, one member of the team may spring a complete surprise on the others, such as when Hoppe ran Susan Scott's "Falderal" during the song "Love Again" for the first time without any consultation. Now it's the regular video for the song.

Different shows may have different multimedia elements, depending on the budget available and the size of the venue. However, the basic preferred configuration consists of two Silicon Graphics Iris Indigo computers, each with a high-speed R4000 RISC processor, a standard CD-quality audio input, the Elan graphics board of four parallel graphics processors, which perform rendering operations in parallel with the main CPU, and the Galileo video board; two computer monitors; a preview monitor; a program monitor; generally a VHS deck ("sometimes we've had the pleasure of having an SP beta deck" says Hoppe); a video switcher, which mixes tapes with computer graphics and mattes out areas and fills them from other sources; video and slide projectors; and screens. Sometimes the slides and video are projected onto the same screen, but usually the slides are independently operated. Obviously, this equipment is far beyond regular desktop standards.

When asked about the variation from one show to another, Fischer replies, "There's enough consistency that the show has an identity—there's the same sorts of imagery used in each show. The only problem that we have is that sometimes the budget goes through the floor and we wind up with a really low-end video projection system." Hoppe finds that with the different models of switcher available, and no ability to rent the same one for every show, she's "got to sit down and correlate in my brain from one piece of equipment to another, because a set of buttons might be named something different from a JVC to a Grass Valley."

D'CÜCKOO AND INTERACTIVITY

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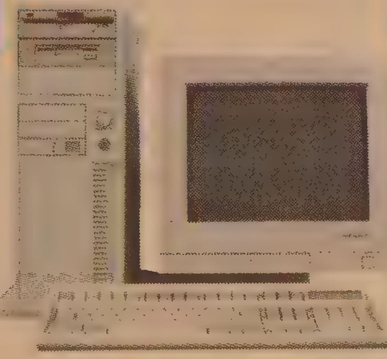

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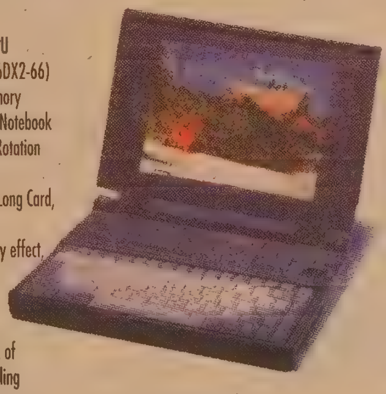

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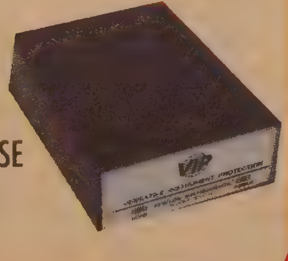

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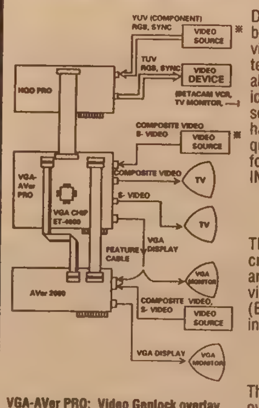

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MultiMedia & beyond

ence, and visual artists, two other elements of D'Cückoo's multimedia performance take it much further.

One is RiGBy (Red-Green-Blue), a digital face puppet, who appears on-screen between songs to banter with band members and entertain the audience, while samples are loaded and, as Pacheco puts it, "things are fixed." RiGBy is a brilliant and very effective innovation for smoothing out the downtime and creating a sense of involvement. Hoppe designed RiGBy's features and Fischer wrote the code to control her using SGI's Inventor 3D Toolkit.

RiGBy's eyeballs, eyebrows, eyelids, and mouth (ranging from smiles to frowns), as well as the tilt and position of the face are controlled by Fischer in real time using the SpaceBall. Her lips are controlled by direct audio input from the voice of the off-stage "Virtriloquist," played by the cyberactive Linda Jacobson. RiGBy's character is impressively developed and the spontaneous interaction between her and Blaine, in particular, is very amusing. Future plans include a variety of facial features that the audience will vote on to change her appearance.

D'Cückoo's second major interactive coup is the MIDIBall—a plastic ball, about 4ft. in diameter and filled with helium, that is bounced around in the air by the audience; each "hit" triggers a MIDI signal through a wireless connection. Once the audience understands what's happening—it is now an expected part of the show—the enthusiasm becomes palpable.

Pacheco came up with the idea after a discussion with George Coates about how much interactivity audiences really wanted. The MIDI signals can also be used to trigger some graphics events on-screen, but as Fischer notes, "When the Ball's out there, the audience is totally focused on it." The MIDIBall is something that can only work in certain venues—low ceilings and lots of lights do not make for a comfortable experience with an overly enthusiastic audience. However, as a device to involve the audience, it is unparalleled.

D'Cückoo constantly work on new ways to improve audience involvement. The main challenges they face are the common ones of lack of time and lack of money. However, they are not afraid to take chances and fix mistakes; Fischer laughingly suggests that people do indeed file bug reports on the shows.

Not surprisingly, D'Cückoo have set up a way to do that. There's a D'Cückoo topic on The WELL, Topic 266 in the Bay Area Tonight conference, and you can send email to *dcuckoo@well.sf.ca.us.*

To experience the D'Cückoo interactive multimedia experience for yourself, attend their next show at the Great American Music Hall in San Francisco on Friday, July 30 at 9pm. Later this year, their second audio CD will be released by RGB Records, a new label set up by some other pioneers, Hearts of Space. In the meantime, you may obtain their first self-released CD for $15 postpaid from 6114 La Salle Ave., Ste. 414, Oakland, 94611. ■

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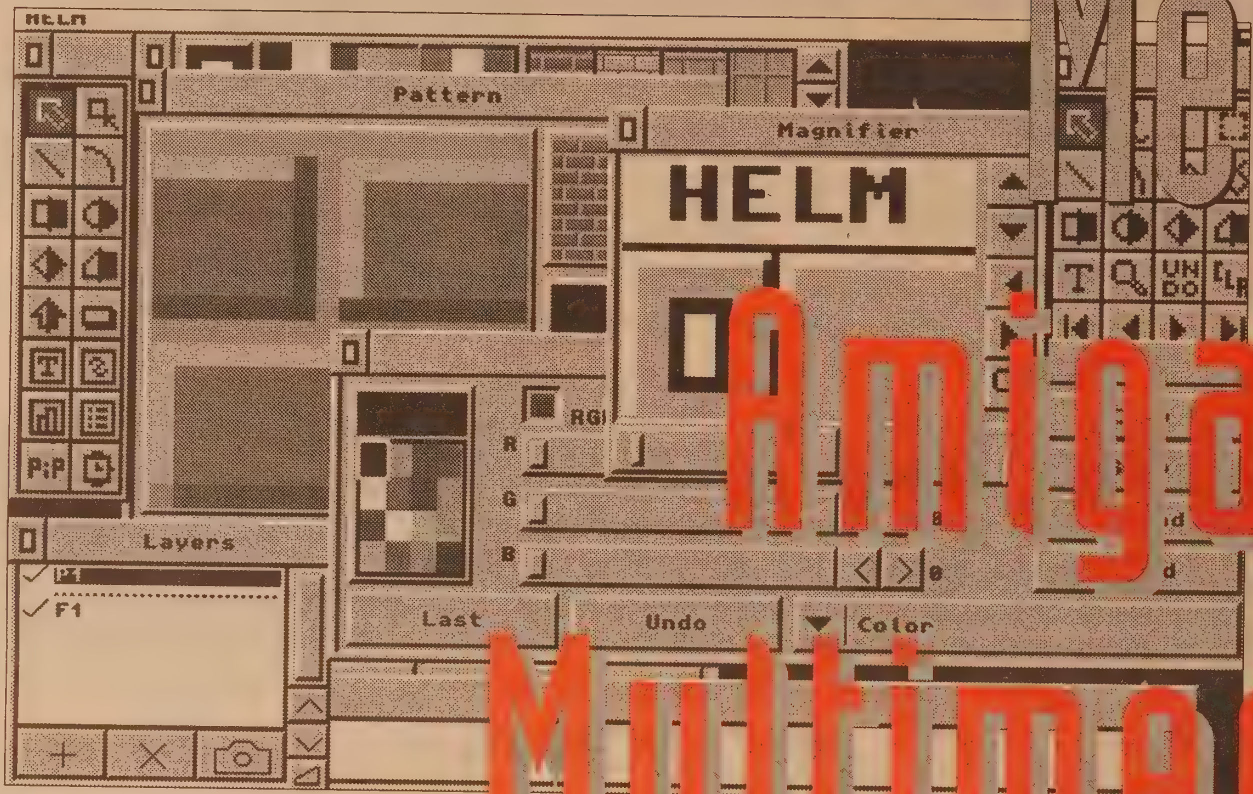

Amiga Multimedia

Part II

BY DOUGLAS J. NAKAKIHARA

Deciding on a multimedia computer platform shouldn't be a popularity contest. What the Amiga lacks in installed base is more than made up in performance. For example, a stock Amiga 1200HD, with a street price of under $800, provides fast graphics, 256,000 colors, NTSC compatibility with composite video output, 4-channel digital audio, a stable preemptive multitasking OS, and much more. Other platforms either don't offer all of these features or require additional hardware and software.

For many multimedia applications, like kiosks and presentations, it just doesn't matter if you use a non-mainstream PC. Additionally, there is some top-notch software available.

Last month we looked at a few Amiga multimedia products; this month we'll finish up with two more: Scala Multimedia MM210 and Helm.

SCALA MULTIMEDIA MM210

You'll find nearly everything you'll need to create professional presentations in Scala Multimedia MM210. Scala uses a flashcard-like approach, where each card (called a "page") controls the graphics, audio, etc. While other authoring packages expect the user to supply all of the pieces to the puzzle, Scala supplies a nice selection of background images, clip art, and fonts.

The sixty-four background images cover a variety of subjects like stones, clouds, fabric, grass, etc. Unless you have a very specific need, you probably won't need to create any yourself. All the backgrounds have been carefully designed using a special color palette scheme. Forty different color palette sets are provided, and you can create your own if you need to.

Scala backgrounds can use any of the palette sets without distorting the image.

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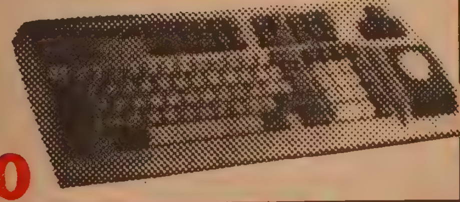

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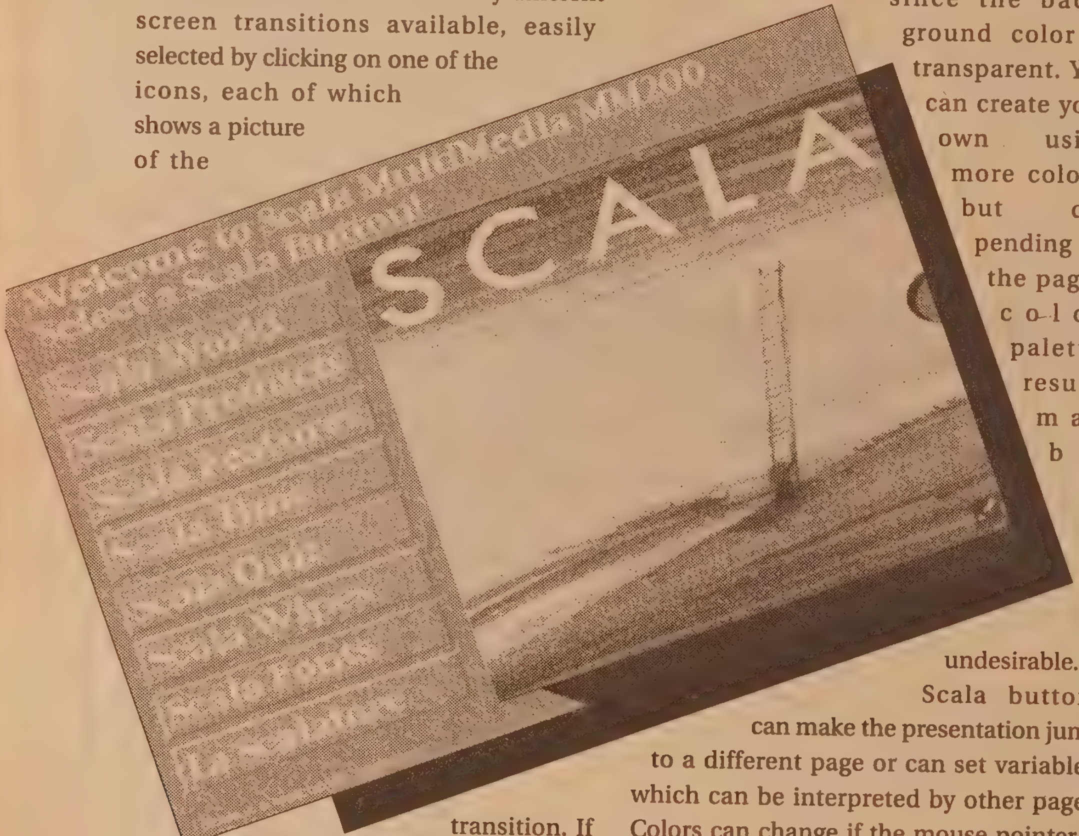
For example, a blue fabric background can be easily changed to yellow fabric, or red. Palette editing tools like swap, spread, and copy, as well as color cycling, are also featured.

By using uniform color palettes, transitions between screens are smooth and beautiful. There are over fifty different screen transitions available, easily selected by clicking on one of the icons, each of which shows a picture of the transition. If you have an AGA Amiga, the fade and superimpose wipes utilize a 24-bit palette for super-smooth transitions.



Scala incorporates powerful text handling features with word processor-like control—word wrap, margins, and adjustable tab stops. Adjustable text attributes include color, outline, shadow, 3-D, underline, bold, and italic. Lines of text can be left-, center-, or right-justified. Every line of text can have different attributes. Shadow length and direction, character and line spacing, underline distance, etc. are all adjustable. An adjustable invisible grid feature allows easy alignment of text when moved. These settings can be saved for later use. Scala also supports color fonts and Workbench scalable Bullet fonts.

Each line of text can be "wiped" onto a page in fifty different ways. This can add a lot of excitement and interest to an otherwise dull, static display. Though these are generally referred to as wipes, they also include animated effects where the text flies in from off screen.

Graphic brushes (i.e., clip art) can be placed on the screen too. These can utilize all of the same effects available for text, like wipes, shadow, etc. Scala comes with many predesigned two-color brushes like arrows, lines, and universal symbols (e.g., No Smoking, Taxi, Train, etc.). They actually appear as one color since the background color is transparent. You can create your own using more colors, but depending on the page's color palette, results may be undesirable.

Scala buttons can make the presentation jump to a different page or can set variables, which can be interpreted by other pages. Colors can change if the mouse pointer is over a button, and display different colors if the mouse is clicked.

Scala provides a way to define the color change in a unique and wonderful way: The color palette is displayed left to right, with a duplicate palette just below. The top palette indicates any possible color used on the screen; the bottom palette indicates what color the color above it should change to. So if you change the color below red to yellow, any part of an object that was yellow would turn red, if selected using the mouse.

Pages can also identify anims to be played. Playback from disk, preloading, dynamic and static buffering are supported. The supplied AnimLab utility allows normal Anim5 format animations to be converted into special formats that Scala can play back at a greater frame rate.

Non-displaying pages can execute other programs or ARexx scripts. They can also set variables and interpret variables to cause something to happen.

As far as sound is concerned, Scala supports IFF samples and SMUS, as well as Soundtracker and DSS music modules. If you have sampler hardware, Scala has a built-in sampling feature with basic editing capabilities. You'll still probably want to use dedicated sampling software to do any serious sound editing.

Pages are normally displayed in a vertical listing. However, the shuffler mode presents the script in a storyboard fashion, where a miniature picture of each page appears on the screen. This allows an intuitive way to arrange and select pages.

Scripts are saved in ASCII format using a language called Lingua. All Lingua commands are also available in ARexx, and Scala scripts can be directly saved in ARexx format. This allows Scala to act as a multimedia engine dynamically interacting with other ARexx-aware programs. Scala's EX system provides a modular way to add new features. Current modules provide support for Videodisc players, MIDI files, CDTV, and ECS genlock control.

The file requestors are very nice and include preset buttons to bring up directories containing backgrounds, scripts, animations, etc. You can even define your own buttons if you wish. Scala is highly configurable, and allows you to set many preferences according to your own tastes and needs.

Scala supports the creation of runtime modules and comes with a detailed manual in a three-ring binder. The inclusion of pictures of the backgrounds and fonts in the manual is a nice touch and a time saver. The manual needs a little updating (and spellchecking) as I found the tutorial a little difficult to follow because of changes made to the program.

The only real gripe I have with Scala is the dongle. This copy-protection device fits in one of the mouse/joystick ports. Fortunately, it does have a pass-thru connector. However, lose it and you're done for. To make matters worse, even the player utility requires the dongle! This means that you cannot freely distribute any of your creations. It's too bad that the people behind Scala feel that this is necessary.

Dongle aside, Scala is the ultimate multimedia program available for the Amiga. Its interface is straightforward and easy to use, and advanced users can utilize its scripting features for even greater power and flexibility.

HELM

Helm is an exciting new authoring package from Eagle Tree Software. Helm takes a

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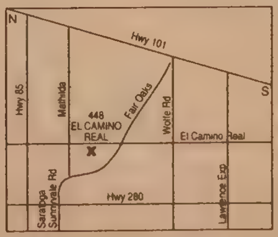

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2	PANASONIC CR-562	320MS AVG. ACC, 300KB/SEC TRF, 64KB BUFFER PHOTO CD MULTISESSION,XA,TRAY TYPE,INTRNL	$249	EXTERNAL OEM $329

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2	WAVE BLASTER	PROTEUS/1XR, 4MB ROM E-MU CHIP, FOR SB/16 FREE CAKEWALK MUSIC SEQUENCING SOFTWARE	$239	FOR SB16/ASP CARD
3	PROAUDIO STUDIO 16	16-BIT, VOICE RECOGN, MIC & MORE SOFTWARE MIDI, 44KHZ REC., BUILT-IN SCSI ($19 F/CABLES)	$209	BUILT-IN SCSI PORT
4	SOUND BLASTER 16ASP	16-BIT, VOICE RECOGN, MIC, 4:1 COMPRESSION MIDI,44kHz,WAVE OPTION ($20 MORE FOR ENCY)	$199	AT-BUS FOR 522/562
5	MSC-01 ENSONIQ 128	DIGITALLY SAMPLED ENSONIQ CHIP, 128 VOICES FOR WINDOWS,FREE TMC850 SCSI FOR TOSHIBA	$189	FREE SCSI ADAPTR
6	LASERWAVE SUPRA 16	MICROSOFT WINDOWS SOUND SYSTEM, SBPRO COMPATIBLE, 16 BIT, 48kHz, ADPCM 4:1 A-LAW	$169	AT-BUS FOR 522/562
7	PROAUDIO SPECTRUM	16-BIT,CD-QUALITY,MIDISOFT STUDIO,MONOLOG MIDI, 44KHZ REC., BUILT-IN SCSI ($19 F/CABLES)	$149	BUILT-IN SCSI PORT
8	SBPRO DELUXE	16 BIT, (8-BIT REC/PLAY) 44kHz,MIDI, 20 VOICE INCLDS. 2 FREE GAMES, ($20 MORE FOR ENCY)	$109	AT-BUS FOR 522/562
9	GOLDEN SOUND CARD	8-BIT, 48kHz PCM, 4:1 COMPR, AD-LIB COMPAT. SOUND BLASTER SUPPORT, MIDI, WINDOWS 3.1	$59	NO CD-ROM PORT

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2	WINDOWS MPC PAK	GROLIER'S MPC ENCY, U.S. ATLAS, WORLD ATLAS CHESSMASTER 3000 ENH., MAVIS TEACHES TYPE
3	SIERRA GAME PAK	KING'S QUEST V, JONES IN THE FAST LANE, ADV. OF WILLY BEAMISH, SPACE QUEST IV, STELLAR 7
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ALTEC LANSING ACS-50.......$79 LABTEC CS-100 SHEILDED....$19
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Multimedia Make Your Point	$69	$79
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Animals In Motion	$37	$42
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Atlas Pack (U.S.&World)	$25	$35
Beyond Wall of Stars	$29	$35
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DTP PRO Clipart (MAC/DOS)	$19	$29
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unique approach to creating applications. In effect, you modify and configure the Helm interface itself until it becomes your application—there is no explicit "save" function. When your application is complete, you can limit an end-user's ability to make modifications. This is markedly different from other Amiga authoring programs, like Scala, where you create a separate application using the main program's interface. (Helm is said to be loosely based on HyperCard, available on the Macintosh.)

Helm's menus are fully configurable and context sensitive. For example, the image menu items are only visible if one of the paint tools is selected. Floating tool boxes provide access to many of Helm's editing tools. Helm also uses pop-up menus, selected with the right mouse button, which generally provide configuration settings for a particular function.

A Helm application is called a "book," which is made up of "pages." Every page has at least one "layer," and any number of objects can be placed on a layer. By using multiple layers, you can independently manipulate the visibility of objects. Normally, objects hold an image or text. Full-screen backdrops can be added by loading an image into an object that takes up the entire screen. As you might expect, any object can act as a "hot spot" and cause a predefined operation to take place.

All objects have extensive configuration settings which vary with the object type, like color, font, background, button type, shadow, border, placement, etc. Several predefined texture patterns are available to use as object backgrounds. Helm provides full control over image objects, including the ability to directly edit them using an extensive set of paint tools with AGA and ANIM support, which can be incorporated into your application.

Helm provides a host of built-in button images with configurable attributes, including commonly used gadgets, like Cycle, Check Box, Multiple and Single Choice, Radio, Palette, Scrolling List, File Requestor, and Sliders gadgets. Additionally, objects can be created using structured drawing tools. There are text objects too that can have actions attached to blocks of text, in hypertext fashion. Helm also features built-in chart object functions.

Images and text can be linked to external files as well as loaded into Helm. If you modify a linked file within Helm, the external file is also changed. Files loaded as "resources" allow you to access them multiple times without having to load several copies of the same file.

The backbone of Helm involves the concept of "forms"—essentially page templates—which provide a base for building pages with similar characteristics, like a common background image. Every book will always have at least one form because it defines a page's resolution, number of colors, and default font. When a new page is created, it inherits all of the current form's attributes, including objects. However, an object's contents are only inherited if it is a shared object. To make a different form current, you simply go

continued on page 312

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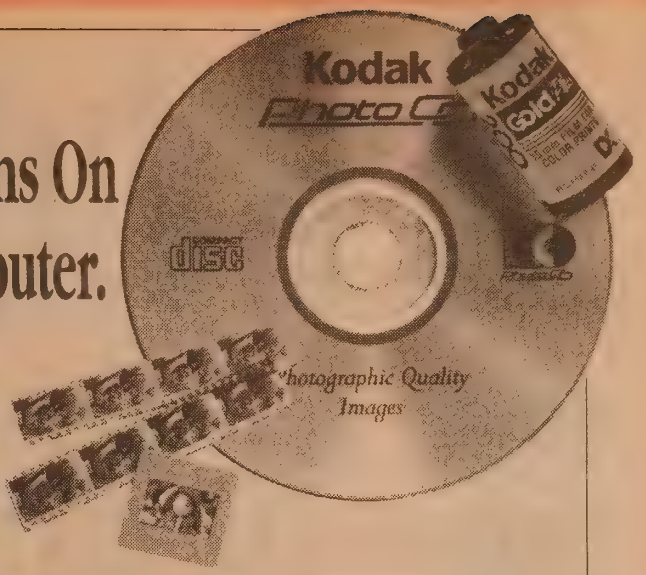

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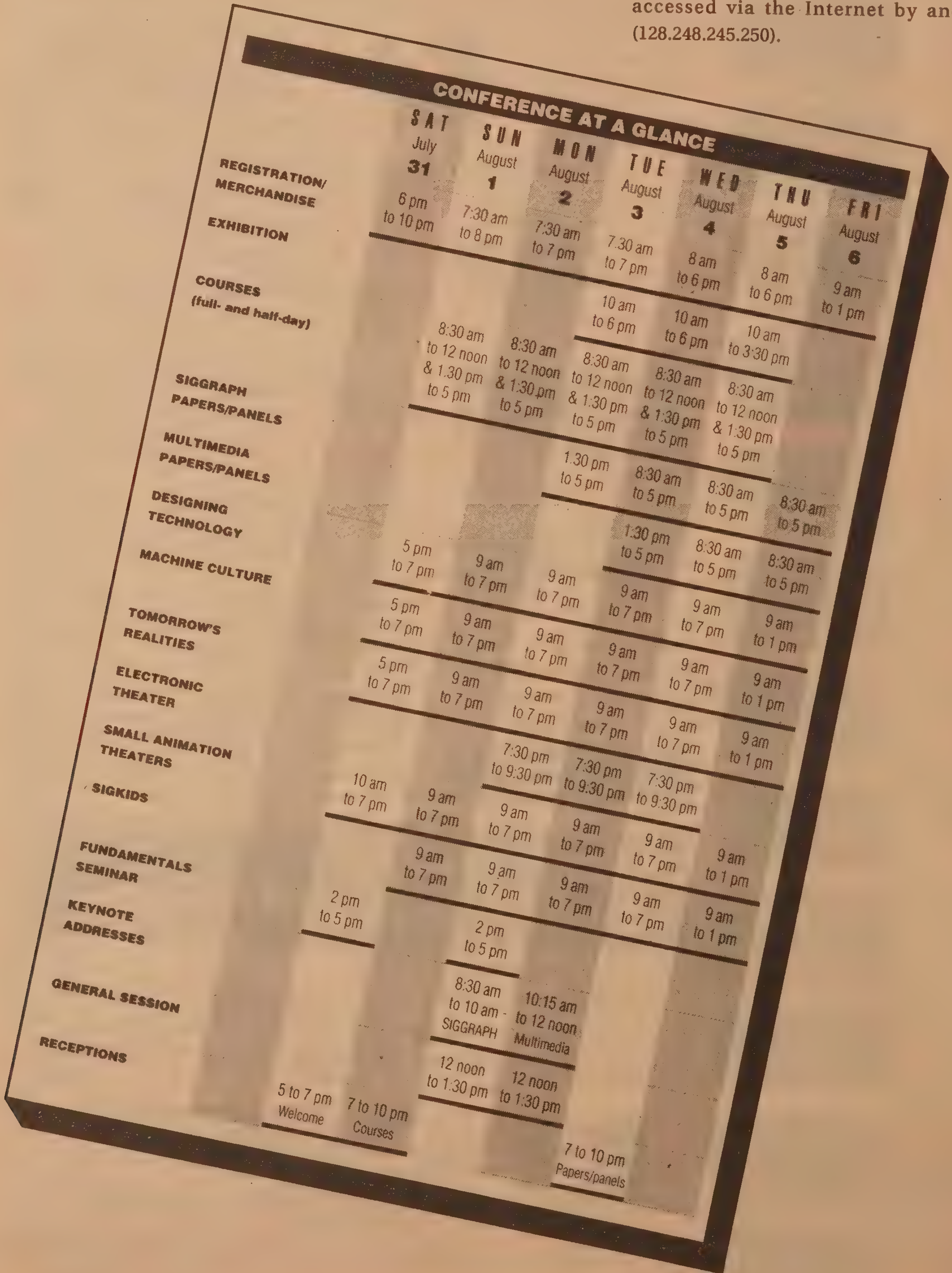
Widely acclaimed as *the* international conference on computer graphics, ACM SIGGRAPH celebrates its twentieth anniversary this year in Anaheim. Offering high-quality seminars and state-of-the-art technology exhibits, SIGGRAPH is an invaluable asset to professionals and beginners alike.

This year the traditional program is augmented by the debut of Multimedia 93, the Association for Computing Machinery's first international show on multimedia.

For more information on the conference, contact SIGGRAPH at (312)321-6830. The entire advance program information can be accessed via the Internet by anonymous ftp to *siggraph.org* (128.248.245.250).



CONFERENCE AT A GLANCE

	SAT July 31	SUN August 1	MON August 2	TUE August 3	WED August 4	THU August 5	FRI August 6
REGISTRATION/ MERCHANDISE	6 pm to 10 pm	7:30 am to 8 pm	7:30 am to 7 pm	7:30 am to 7 pm	8 am to 6 pm	8 am to 6 pm	9 am to 1 pm
EXHIBITION				10 am to 6 pm	10 am to 6 pm	10 am to 3:30 pm	
COURSES (full- and half-day)		8:30 am to 12 noon & 1:30 pm to 5 pm	8:30 am to 12 noon & 1:30 pm to 5 pm	8:30 am to 12 noon & 1:30 pm to 5 pm	8:30 am to 12 noon & 1:30 pm to 5 pm	8:30 am to 12 noon & 1:30 pm to 5 pm	
SIGGRAPH PAPERS/PANELS				1:30 pm to 5 pm	8:30 am to 5 pm	8:30 am to 5 pm	8:30 am to 5 pm
MULTIMEDIA PAPERS/PANELS					1:30 pm to 5 pm	8:30 am to 5 pm	8:30 am to 5 pm
DESIGNING TECHNOLOGY		5 pm to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 1 pm
MACHINE CULTURE		5 pm to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 1 pm
TOMORROW'S REALITIES		5 pm to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 1 pm
ELECTRONIC THEATER				7:30 pm to 9:30 pm	7:30 pm to 9:30 pm	7:30 pm to 9:30 pm	
SMALL ANIMATION THEATERS		10 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 1 pm
SIGKIDS			9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 1 pm
FUNDAMENTALS SEMINAR		2 pm to 5 pm		2 pm to 5 pm			
KEYNOTE ADDRESSES				8:30 am to 10 am - SIGGRAPH	10:15 am to 12 noon Multimedia		
GENERAL SESSION				12 noon to 1:30 pm	12 noon to 1:30 pm		
RECEPTIONS		5 to 7 pm Welcome	7 to 10 pm Courses			7 to 10 pm Papers/panels	

FULL-DAY COURSES

SUNDAY, 1 AUGUST
01 Character Motion Systems
02 Introduction to Scientific Visualization Tools and Techniques
03 Developing Large-scale Graphics Software Toolkits

MONDAY, 2 AUGUST
20 Computer Graphics in Visual Effects
21 Three-dimensional Visualization Using Medical Data
22 Making Radiosity Practical
23 Applied Virtual Reality
24 Graphic Design for User Interfaces
25 Modeling, Visualizing, and Animating Implicit Surfaces
26 The OpenGL Graphics Interface
27 MM: Designing Multimedia Environments for Children
28 MM: Multimedia Systems: A Guided Tour
29 MM: Concept of Color, Video, and Compression

TUESDAY, 3 AUGUST
40 Modeling in Computer Graphics
41 Volume Visualization
42 Global Illumination
43 Implementing Virtual Reality
44 Procedural Modeling and Rendering Techniques
45 MM: Survey of Formal Standards for Multimedia Systems

WEDNESDAY, 4 AUGUST
60 An Introduction to Physically Based Modeling
61 Film Craft in User Interface Design
62 Fundamentals and Overview of Computer Graphics

THURSDAY, 5 AUGUST
80 Recent Techniques in Human Modeling, Animation, and Rendering
81 An Introduction to Data Sonification
82 Curve and Surface Design: From Geometry to Applications

FRIDAY, 6 AUGUST

APH 93

Multi & Media

beyond

TECHNICAL PROGRAM AT A GLANCE

HALF-DAY COURSES	TIME	SIGGRAPH PAPERS	MULTIMEDIA PAPERS	SIGGRAPH PANELS	MULTIMEDIA PANELS
10 LAB: Programming PEX with PEXlib (beginning) (also #50) 11 Introduction to Volume Visualization: Imaging Multidimensional Scientific Data	8:30 am–12 noon				
15 LAB: Programming PEX with PEXlib (intermediate) (also #70) 16 Stereo Computer Graphics with Application to Virtual Reality	1:30 pm–5:00 pm				
30 LAB: Programming PEX with HOOPS	8:30 am–12 noon				
35 LAB: Programming PEX with PHIGS (also #75)	1:30 pm–5:00 pm				
50 LAB: Programming PEX with PEXlib (beginning) (also #10) 51 MM: Copyright Protection for Software, Graphics, and Multimedia 52 MM: Multimedia and Multimodal Parsing	8:30 am–10:00 am	SIGGRAPH 93 Keynote Address			
	10:15 am–12 noon				
55 LAB: Programming PEX with PEXtk, a GL-like API 56 MM: Structured Design of Hypermedia Applications 57 MM: Large Multimedia Databases	1:30 pm–3:15 pm	Surfaces		Stereo Lithography: Rapid Prototyping in 3D	
	3:30 pm–5:00 pm	Hardware		Visual Thinkers in an Age of Computer Visualization: Problems and Possibilities	
70 LAB: Programming PEX with PEXlib (intermediate) (also #15) 71 Visualizing Planet Earth	8:30 am–10:00 am	Interaction		Updating Computer Animation: An Interdisciplinary Approach Facilitating Learning with Computer Graphics and Multimedia	
	10:15 am–12 noon	Multimedia 93 Keynote Address			
75 LAB: Programming PEX with PHIGS (also #35) 76 The Fundamentals of Color Desktop Publishing in Print Production	1:30 pm–3:15 pm	Rendering Architectures	Communication Protocols	Visualizing Environmental Data Sets	Digital Libraries of the Future
	3:30 pm–5:00 pm	Virtual Reality	Compression and Coding Content-based Retrieval	How to Lie and Confuse with Visualization The Application of Evolutionary and Biological Processes to Computer Art and Animation	
	8:30 am–10:00 am	Global Illumination	Communication Systems Hypermedia	Urban Tech-gap: Museum and University Liaisons—A New Electronic Bridge Virtual Reality and Computer Graphics Programming	
	10:15 am–12 noon	Light and Color	Media Synchronization Multimedia Toolkits	Ubiquitous Computing and Augmented Reality	Networked Multimedia Emerging Software Architectures
	1:30 pm–3:15 pm	Numerical Methods for Radiosity	Delay Sensitive Retrieval Using Video in Group Collaboration	Merging 3D Graphics and Imaging—Applications and Issues Nan-o-sex and Virtual Seduction	
	3:30 pm–5:00 pm	Visibility	Video Processing	Critical Art/Interactive Art/Virtual Art: Rethinking "Computer Art"	Multimedia Publishing: Your Conference CD-ROM
	5:00 pm–7:00 pm	SIGGRAPH Town Hall Meeting			
	8:30 am–10:00 am	Visualization	Network Performance Authoring	Digital Illusion: Theme Park Visualization—Part One	
	10:15 am–12 noon	Processing Synthetic Images	Documents	Digital Illusion: Theme Park Visualization—Part Two	The Future of Video Dial Tone
	1:30 pm–3:15 pm	Techniques for Animation	Video Servers Information Access	Man vs. Mouse Multimedia and Interactivity in the Antipodes	
	3:30 pm–5:00 pm	Natural Phenomena	Collaboration Systems Support for Video Applications	The Integrative Use of Computer Graphics in a Medical University	

Multi & Media beyond

HyperStudio:

Multimedia For The Masses

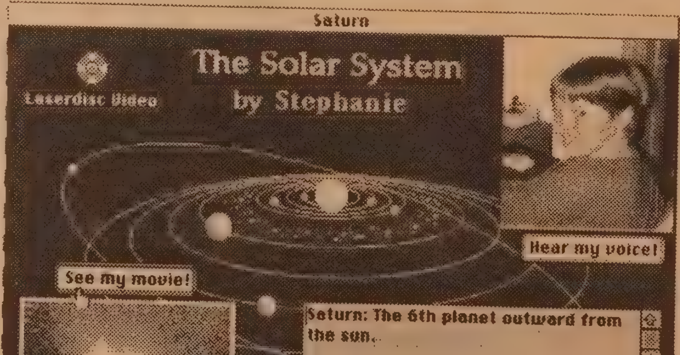
BY TONY REVEAUX

Easy Enough For Kids—And Executives

Each month, the threshold of accessibility for multimedia authoring, reading, and communicating drifts lower and lower. The learning curve, though, is still prohibitive for most people. Color, sound, animation, photos and video—and absolute interactivity—should be as accessible to us as word processing is with MacWrite and WriteNow, and graphics with MacPaint and DeskPaint.

Brøderbund's KidPix and Davidson's KidWorks, though targeted at the K-6 range, come the closest to being models of direct, instinctive multimedia authoring. KidPix expands the variety and functionality of graphic tools to the automation of dynamic, and even chance-driven, special effects with sounds. With KidPix Companion, authoring and editing with QuickTime documents is simple and clear. Davidson's KidWorks has many of these attributes, as well as word processing, and can also convert text to voice.

But as genuinely delightful and absorbing as these programs are, the thick, sticky "kidness" of them can begin to work against the adult who just wants to punch



Saturn: The 6th planet outward from the sun.

The rings of saturn were first seen by Galileo, using his telescope. Later, the rings seemed to disappear when Saturn moved so that the rings were tilted so that theu were edge-on to

HyperStudio is a hypertext authoring program that supports color, sound, voice recording and playback, animation, laserdisk control, and QuickTime

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Tony Reveaux, a San Francisco-based consultant, is the editor of Computer Publicity News *and the author of* "Cool Mac Clip Art Plus!" *from Hayden Books. He can be reached via Usenet (luna@well.sf.ca.us) or MCIMail 290-3008.*

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MT

With the Macintosh version of Roger Wagner's HyperStudio, we have the Volkswagen of multimedia authoring.

out some quick "media processing." Now, with the Macintosh version of Roger Wagner's HyperStudio ($179), we have the best thing so far for direct, "Point-A-to-Point-B" communication—the Volkswagen of multimedia authoring.

I came across HyperStudio while at the thirty-sixth San Francisco International Film Festival in April, where one of the highlights was the screening of *The Last Bolshevik* by French auteur filmmaker Chris Marker (*La Jete, La Jolie Mai*). Marker, who's been using HyperStudio with great enjoyment, drew my attention to the program. In a demonstration on an Apple IIGS, I saw a presentation of multimedia documents created by grade-school students and teachers. Lively, inventive and active, they were full-color multimedia with sound, music, voice, animation, digitized photos, QuickTime movies, and transition effects.

Wagner has been a tireless promoter of his company and of enlightened education, well known for his lurid ties as well as his generous enthusiasm. HyperStudio, first developed on the now-discontinued Apple IIGS platform, has become entrenched in the K-12 in six years. When I asked Wagner if he planned to promote the new Macintosh version to a wider audience, he replied that he was comfortable and successful within the school market; he feels that theirs is too small a company to invest in huge promotional blitzes. So here is something really neat you might not hear about elsewhere.

MULTIMEDIA: SQUARE ONE

Jeff Peach, a sixth grade teacher at Magnolia Intermediate School in Grass Valley, leads one of the thousands of classrooms that use HyperStudio. His class produces interactive HyperStudio presentation documents with standard, consumer-electronics-level VHS camcorders, the $350 Apple II Video Overlay Card in a IIGS, and about $3,000 worth of Panasonic editing equipment.

"Not fancy stuff," he says, "but it does allow you to do a pretty good job in cutting and pasting video. We're producing a video for Roger Wagner, called HyperStudio Made Easy. Roger wanted a twenty- to thirty-minute video; I've used HyperStudio in my classroom for a long time, so we assembled all the pieces and put together a whole piece to show how HyperStudio comes together. It's a slick little production. I even got one of the parents to do the music.

"I've used Apple's HyperCard," continues Peach, "but there's no comparison at all as far as I'm concerned. HyperCard is a wonderful program. It can probably do fancier things than HyperStudio can do, like HyperTalk and some unique scripting, but as far as ease-of-use in classroom applications, I think HyperStudio has it beat hands down. It can use HyperLogo, but I haven't needed to go to that so far. I've talked to other teachers that were HyperCard people, and said, 'Check this program out, especially now that it's on the Mac;' they work with it for fifteen minutes and they're sold. It's so easy to use and to teach, and it's in color. Kids get excited about color. This color-Nintendo-graphics-animation generation—it's their world."

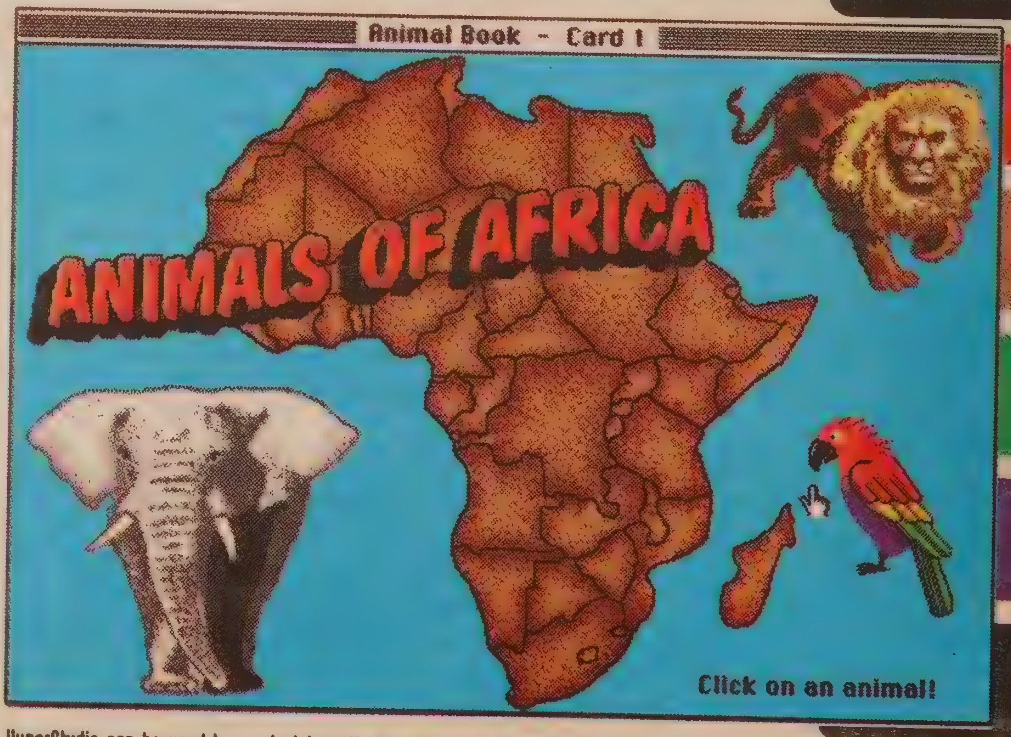
HYPERLOGO

Wagner's HyperStudio includes support for HyperLogo script command sequences, much as HyperTalk extends the capabilities of Apple's HyperCard.

HyperLogo is a later version of the venerable Logo, a high-level "easy to learn" programming language written for children in the 1970s by Seymour Papert of Massachusetts Institute of Technology, combining graphics with straightforward English-like instructions. HyperLogo incorporates TurtleGraphics, a tightly written and versatile graphics primitive extension of Logo. HyperLogo includes mathematics functions, basic and/or logic, and the TOOT sound commands that can be given MIDI-specific attributes.

Teachers, educators and learning technicians here and in Europe have nurtured Logo for years, drawn to it for its accessible and reliable performance. Compared to some other languages used for educational applications, Logo presents a Tinkertoy- or Lego-like paradigm of connective clarity.

Its easy auditing and reporting make it a natural for testing and scoring structures. HyperStudio has a simple test-and-score stack template that can show correct and incorrect answers and accumulate test



Animal Book - Card 1

HyperStudio can be used to create interactive educational documents by the very schoolchildren that they are meant to serve.

RESOURCES

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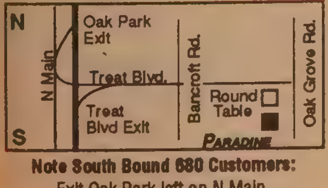

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results. All this can be created in multimedia with sounds and animations for reinforcement and variety. HyperStudio includes an informational stack on HyperLogo and a text document which is a manual for using the language.

HYPERSTUDIO PRACTICE

But HyperStudio is so basically complete without ever sampling HyperLogo that you can just go in and plug 'n play. HyperStudio shares with HyperCard and SuperCard the card-and-stack metaphor; cards and stacks can be built with hypertext links activated by visible and invisible buttons or with timers. Building a stack is swift and easy, and provides instant sampling at every level. What helps is its interface automation, where the next step, whether it is positioning a button, choosing a sound or activating another element, is brought up right before you. The interface leads the way throughout the process.

Creating animation sequences is easy, with HyperStudio's simple replacement, or "flipbook," method. The draw and paint functions are adequate, except for the absence of rotation. HyperStudio can work with 16 or 256 colors, but you can import graphics, including 24-bit documents that have been reduced to 8 or 16-bit. (A special black-and-white version of the program is available by request.) There is a fully functional Pioneer LaserDisc control interface for a remote device.

QuickTime movies are imported as easily as a sound or a clip art graphic. In tune with the Performa Generation of Macs, you can record voice and sound directly into the program. Like HyperCard's Buttons, New Button Actions (NBAs) are special programs that extend the functionality of stacks, and are written from various sources. Two that are included in the package are Roll Credits, which scrolls text like a movie's credits, and Animator, which supports path-based animation.

Is the new HyperStudio now thoroughly modern Mac? QuickTime is a good test. The QuickTime MooV of NASA's Saturn flyby, included in one of the package's school demonstration files, worked fine. But how easy was it to acquire QuickTime documents? To put it to the test, I mounted BMUG's "TVROM" CD- ROM in an external drive. Since I had just come from the sneak preview of *Jurassic Park* hosted by SuperMac, naturally the MooV I chose from the "TVROM" was "Gecko Eats Cricket." Nothing could be easier—I could position its window and the button anywhere on the card, and then punch 'n play. It was just as easy to add the sound effect of an elephant's trumpeting roar to make the scene truly complete.

I've always been comfortable with HyperCard, but HyperStudio is incredibly fast and easy, and supports full color. HyperStudio is rougher and doesn't have the bells, whistles or pull-chains, but for multimedia to be ultimately viable, it has to be able to be this easy. ■

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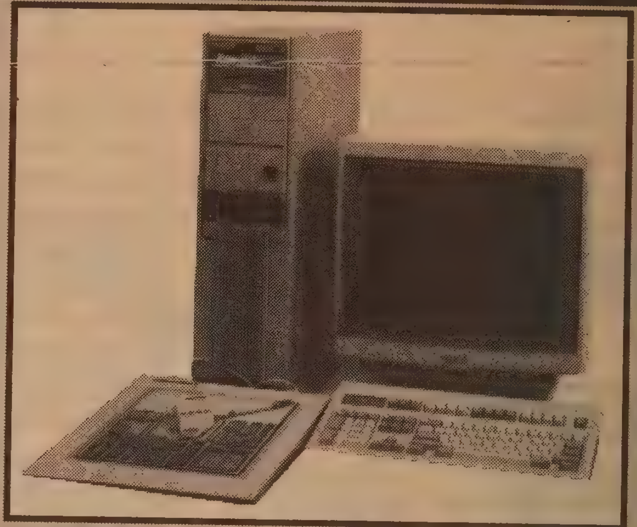

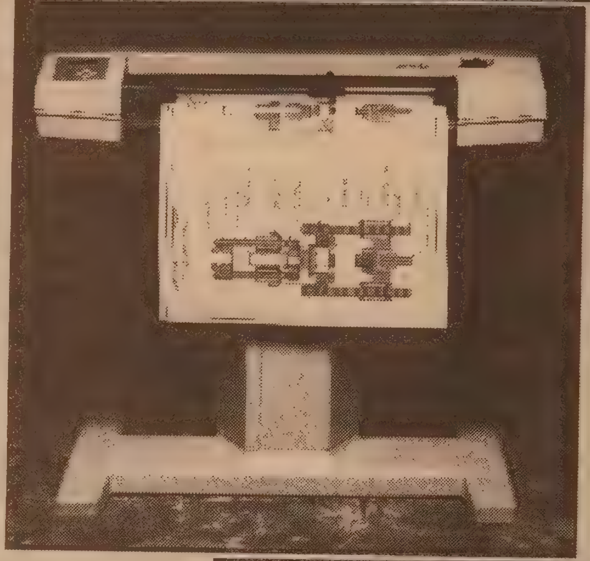

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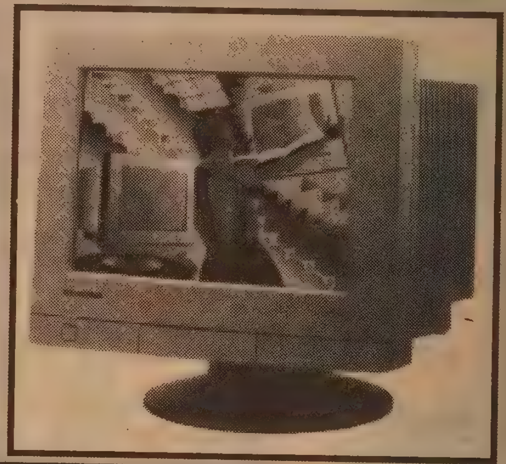

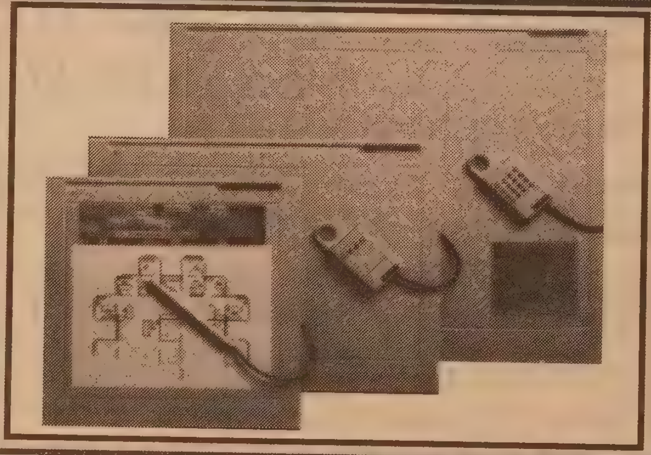

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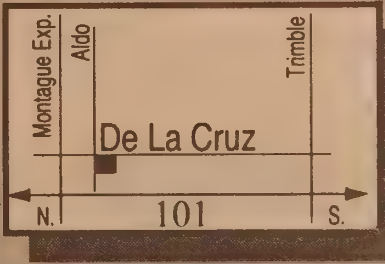

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continued from page 301

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Helm features an incredibly rich programming language called Breeze, which allows you to control your application from an internal script. These scripts are generally triggered by selecting an object with the mouse. ARexx commands and files can be executed directly from the program, and Helm itself is controllable from ARexx using Breeze commands. Support for in-line ARexx commands is coming.

For audio, Helm supports IFF samples, SMUS files, MIDI, and CDTV. GVP IV24 PIP, narrator device, 2.0 genlock, telephone touch tone, printing, and serial port support is included as well. Extensive keyboard shortcuts and a freely-distributable player program are also featured.

At times the program seems a bit awkward, but this should disappear as the product matures. (I've already received several updates in the few weeks I've been reviewing Helm.) The main shortcoming I found was that the 336-page 8 1/2" x 11" manual and supplemental documentation did not clearly convey the basic concepts you need to thoroughly understand before using Helm. Without that basic understanding, Helm can be bewildering. More illustrations and step-by-step details in the tutorial would be very beneficial.

Once I figured things out, I started to really enjoy this program. One of Helm's strongest features is its ability to integrate AmigaDOS gadgets into an application. This can be a daunting chore with other authoring programs. Also, Helm's author, Jerrell Nickerson, is available for technical support—there's nothing like talking to the author when you need help—and he is very open to comments and suggestions.

Helm is an extremely powerful program and I've only touched on some of its abilities. In many respects, it is very similar to INOVAtronics' CanDo and could provide some competition. Because Helm features screen and brush wipes—something CanDo can't do—it is a fine interactive multimedia creator. Helm can also be used to make free-form databases, custom image editors, and other application programs. At a list price of $129, it's a steal!

That wraps up my Amiga multimedia review. I probably missed a few products, but I've certainly covered the main offerings. I hope I've demonstrated that the Amiga is a sound choice for multimedia application development. ■

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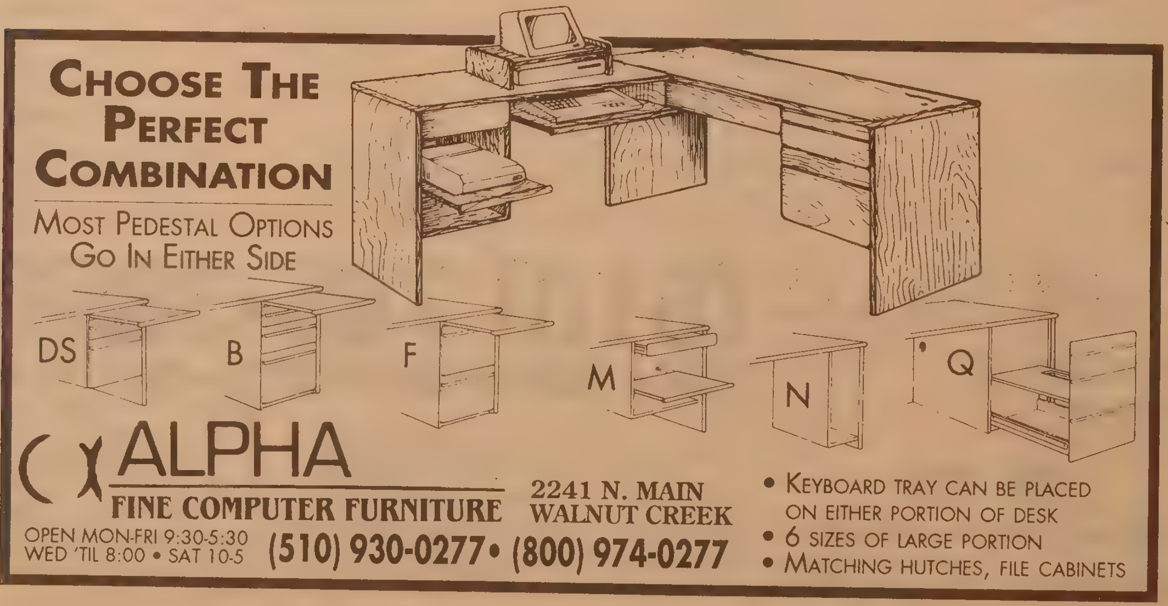
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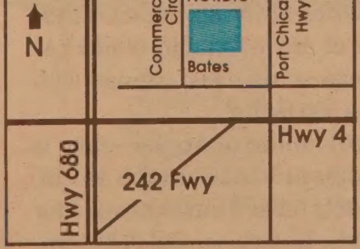

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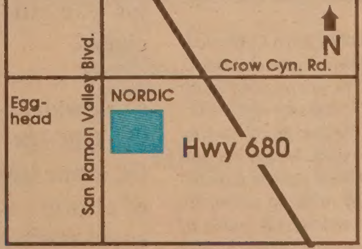

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Revisiting The Parallel Universe After Reports That It's Getting Weirder

or

Meandering Around World XA-1b

BY JOHN C. DVORAK

As physicists and time-travelers alike know, there are parallel universes. If you want to visit them, the key is finding the intersects. Years ago, the University of California opened a set of gateways to various parallel universes determined to be stable.

DVORAK'S LAST COLUMN

I was allowed to enter World XA-1b, a universe that closely parallels our own, especially in the area of technology, where almost everyone involved in our world's computer business exists in World XA-1b, except that they all have different jobs. I had the opportunity to catch up on these developments last month when the operators of the secret Berkeley gateway allowed me two days in World XA-1b.

Here's my report.

It was hot and sunny today. I was at CORDEX, the Corporate Exhibition run by David Bunnell—the COMDEX of XA-1b and the biggest show in the world. Bunnell is a multibillionaire after selling his stock in Sirius Computers, the leading maker of DEC clones.

DEC is the dominant computer company worldwide, especially since it invented the hot DEC/DC (DC=desktop computer). The DC clone business was perfected by a slew of cloners including IBM, Burroughs (a small startup) and the leading mainframe company, Apple.

It was so confusing I had to find Bill Gates and find out what's happening in the industry and where everyone was. Gates is the leading financial analyst for Hambrecht & Kleiner.

Gates is annoyed and somewhat disbelieving when you tell him that his namesake in the standard universe (the Cal professors call it World XA-1a) is a well-known billionaire. "It's hard to believe it," he says. "And it's particularly hard to imagine something called an IBM PC and that IBM is a leading company. It's too weird to contemplate."

According to Gates, here is the status of major personalities:

•**Mitch Kapor** (in XA-1a, cofounder of Lotus)—Never known to be involved in computers, but well-known as a great French-style chef at a Boston restaurant called Mitch's Bistro. Lotus Development exists in XA-1b, but they're strictly a maker of power strips renowned for their hand-painted designs. The strips are sold on street corners by hippies.

•**Jim Manzi** (in XA-1a, CEO of Lotus)—The first world-class cricket player to come from the United States.

•**Microsoft**—Stuffed doll maker.

•**Steve Ballmer** (President of Microsoft)—TV psychic, best known for accurately predicting that the President of the United States, **Gary Hart**, would have a nosebleed during the State of the Union speech while attempting to give the speech in Pig Latin. His trademark on TV is that he closes out his show, each and every week, by force belching the words "See you next time!"

•**Larry Ellison** (CEO of Oracle Software)—Soap opera actor who plays Luke in *Day in the Life*, the hottest series on TV. Curiously, in the same series **Mary Eisenhart** (kind-hearted editor of *MicroTimes* in World XA-1a) plays a mean-spirited evil woman with a British accent. Go figure!

•**Steve Jobs** (cofounder of Apple)—Jobs is the top investment banker in the world, and unfortunately tubbed out to nearly four hundred pounds. Known as, and calls himself, "Fat Steve from Jersey." Famous for world championship distances in the International Cherry Pit Spitting Contest.

•**Steve Wozniak** (cofounder of Apple)—Software designer known for inventing Pascal! Largely responsible for making Pascal the standard desktop computer language. BASIC is entirely unknown in World XA-1b.

•**John Sculley**—The US Ambassador to Singapore. Never involved with computers. Known for writing a book in which he whines incessantly about how hard it is to program a VCR.

•**Philippe Kahn**—CEO of Borland International, a maker of software for the Tramiel 64 home computer—a cartridge machine. Philippe, a former ballet dancer, always wears a black suit and greets everyone with the words, "Uh, and WHAT I can DO you for?" Known for an amazing ability to mock Curly of the Three Stooges.

•**Ray Noorda** (Novell in XA-1a)—Aeronautical engineer best known for designing the Boeing-Douglas 947 jumbo jet. A recluse nowadays after trying to promote a personal jet copter. Very wealthy. As a lark he had the hand of a former partner surgically grafted onto the top of his head two years ago and can make it wave "hello."

•**Paul Brainerd** (Aldus)—Owns a paper mill. Has very long hair and has been trying to reinvigorate the hootenanny craze of thirty years ago. Has three "sing along" albums out.

•**Scott Cook** (Intuit)—Sole owner of Cook's of Hollywood, a store specializing in sexy lingerie for women. Best known as a part-time inventor. Holds over four hundred patents including one for a chicken cooking basket that fits inside the car engine compartment and uses engine heat to cook. Head of a number of energy conservation "nutball" organizations. Tried to criminalize hyperventilation.

•**John Akers** (former CEO of IBM)—Police detective who writes novels. Last book: "Bad, Blue and Full of You."

•**John C. Dvorak** (columnist)—Market director for the largest manufacturers of egg timers and battery-powered swizzle sticks. Known for a Guinness World record where he walked up fifty flights of stairs hand-standing. (Oh well!) ■

© 1992 by John C. Dvorak. All rights reserved. John C. Dvorak graduated from the University of California. He is a contributing editor of PC Magazine *and* MacUser, *and is considered by many to epitomize the contrarian view of things—a charge that he vehemently denies. Dvorak's motto is: If you have nothing nice to say, then don't say anything at all.*

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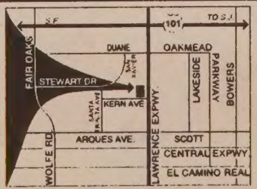

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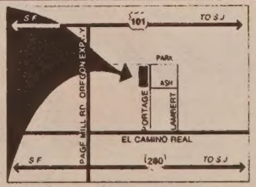

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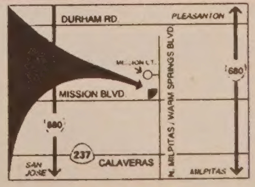

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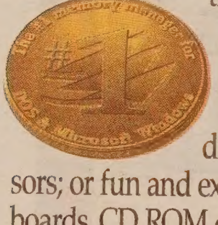
Even a *free* memory manager may not be a bargain—especially if it can't give you all the memory you need.

Introducing QEMM 7 The Memory Manager Worth Paying For

The newest version of QEMM, version 7, pioneers new ways of using the critical area between 640K and 1024K. It optimizes this area, taking into account the many drivers that need more memory at start-up than when running; instantly calculating millions of possible memory configurations to find still more memory for your applications, TSRs and utilities to use.

Instant Riches

What does more memory mean in a practical sense? It means that your DOS and MS Windows programs run faster, smoother and more reliably. It means you can continue to add valuable utilities, drivers, TSRs and new capabilities to your PC. Whether it's workhorse drivers like LAN utilities and fax drivers; productivity-enhancers like disk caches and disk compressors; or fun and exciting capabilities like sound boards, CD ROM drivers, graphics tablets, etc. The better your memory is managed, the more versatility and flexibility your PC will have. QEMM 7 lets you have it all without fear of 'out of memory' messages or crashes.

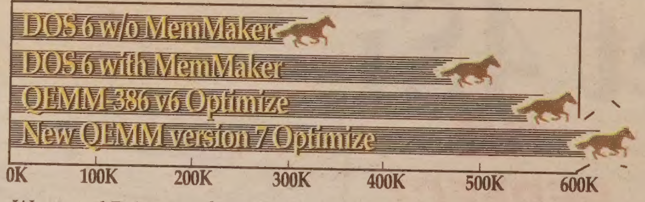

The #1 memory manager for DOS & Microsoft Windows

DOS 6 Giveth; DOS 6 Taketh Away

The best feature of new DOS 6 is the stable of utilities it includes. Trouble is, they all eat up memory. DoubleSpace file compression needs 43K, Vsafe anti-virus needs 7-45K, Smartdrv disk cache needs 28K and even Undelete takes 10-14K as a resident program. Using MemMaker, you could easily lose—not gain— available 'conventional' memory in DOS 6.

New QEMM 7 takes the best of the new DOS 6 features into account, finding ways to cut memory demands for these utilities by up to 80%, ensuring that the all-important memory below 640K is free for your programs. And QEMM 7's seemingly small feature of supporting DOS 6's multiple configurations gives you the flexibility and ease of setup that you expect. (MemMaker doesn't work well with this important DOS 6 feature.)

How to Look a Gift Horse in the Mouth



We tested DOS 6 with and without MemMaker and QEMM6 and our new QEMM 7 runs away from all of them. See details of test conditions listed below.

Page Frame: the Key to Your Future

There's been a lot of jealous talk about our patent-pending Stealth technology. Nobody else can duplicate its 48-115K gains.

The key to Stealth is its use of a 64K reserved area above 640K called the page frame. Besides being used by Stealth, the page frame lets Lotus 1-2-3 r2.x run larger spreadsheets and WordPerfect 5.x larger documents. It's also used by DESQview for multitasking, Novell Netware, IBM LAN Server and DECnet for reducing the network driver memory footprint, plus games for fast action. You sacrifice all this when other memory managers turn off the page frame. Stealth saves you room to set up your PC with a mouse, CD ROM, sound board, a network such as Novell NetWare, create 8-24K of extra memory for optimal MS Windows performance, use all of DOS 6's memory-hungry utilities and still have more than 630K to run applications smoothly and safely.

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Put Your Money on a Winner QEMM 7

The new and ever more exciting capabilities coming to your PC will all compete for memory with your favorite applications, TSRs and drivers. And that makes QEMM 7 the most vital utility you can own.

Our seventh-generation memory manager is a thoroughbred that helps you get the most out of your PC today and tomorrow.

Quarterdeck

How we got the chart numbers CPU—486/33 ALR Power/business VEISA machine equipped with 16 megs of RAM and running MS-DOS 6. Comparisons were done using the following memory managers: QEMM 7, QEMM 6.02, MS-DOS 6 MemMaker. In addition to the driver (or drivers) required by each memory manager, the following drivers, DOS resources and programs were loaded for all comparisons: in the CONFIG.SYS file: SETVER.EXE, DOS=HIGH, FILES=20, BUFFERS=10, STACKS=0.0, MVSOUND.SYS, SNDBK12.SYS, SLCD.SYS, DOS SHELL=statement, in the AUTOEXEC.BAT file: VSAFE, MSCDEX, UNDELETE, LSL.COM, NE2000.COM, IPXODI.COM, NETX OR EMSNETX, MOUSE.COM, SMARTDRV.COM, PRTSCCAP.COM. ©1993 Quarterdeck Office Systems. Trademarks are property of their respective owners.

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